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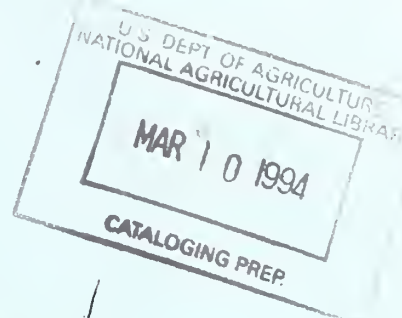
# Neotropical Migrant Landbirds in the Northern Rockies and Great Plains



United States  
Department of Agriculture

Forest  
Service

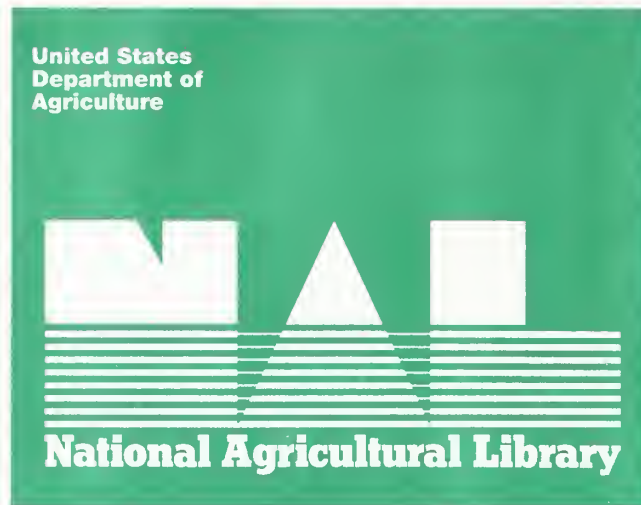
Northern Region



A Handbook for  
Conservation  
and Management

by  
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## PREFACE

This book covers the geographic region defined by the United States Forest Service as "Region 1" (a.k.a. the "Northern Region")—a vast area extending across the northern tier of states from eastern Washington to North Dakota. The area encompassed includes six states in whole or in part: Montana and North Dakota in their entirety, the northern half of Idaho, and the northernmost portions of Wyoming and South Dakota, as well as the easternmost slice of Washington (Figure 1). Fewer than 200 species of landbirds breed within this region but more than 75 percent of these undertake an annual roundtrip migration between their breeding grounds in North America and their wintering grounds that extend south beyond the United States border with Mexico.

Our focus is the status, conservation, and management of the 144 species of landbirds that breed within Region 1 and whose populations winter in whole or in part in Mexico, Central America, South America, and the islands of the Caribbean. These areas constitute the "Neotropics," or "New World" tropics (in contrast to the "Paleotropics" or "Old World" tropics of Africa, Asia, and India), hence the initially cryptic phrase "Neotropical migrant landbirds" used to describe the species covered herein.

Why these species? Why this geographic region? Why now? Only recently has it become alarmingly clear that many Neotropical migrants have undergone significant, widespread declines at local and regional levels across at least the eastern portions of their breeding ranges in the United States and Canada. The picture in western North America for this ecologically diverse group of species is far from clear. An assessment of the state of our knowledge about these species at regional levels within the West is a logical beginning from which to embark on efforts to examine population and community patterns of these species and to understand the effects of land-management activities on this diverse group.

Traditionally, management agencies paid virtually no attention to nongame species until populations dwindled to the point of ecological no-return and were declared officially Endangered or Threatened. To continue such a strategy will surely result in failure to preserve overall biological diversity, as a recent assessment of this approach for birds should make clear (Ehrlich, Dobkin, and Wheye, 1992).

In recognition of the need for a proactive rather than reactive response to this potential crisis, the National Fish and Wildlife Foundation proposed the Neotropical Migratory Bird Conservation Program known as Partners in Flight (National Fish and Wildlife Foundation, 1991). This program was conceived as a comprehensive and cooperative effort involving partnerships among federal, state, and local government agencies, private-sector foundations, professional organizations, non-government conservation groups, relevant industries, and the academic communities in both North and Latin America. The primary goal of this venture is to gather together the cooperative and coordinated resources of all concerned organizations and bring them to bear on the improvement of population and habitat monitoring, research, management, education of the public, and the forging of international partnerships. By virtue of their expertise and responsibility for the greatest amounts of potentially critical habitats, the U.S. Fish and Wildlife Service and the U.S. Forest Service are the lead agencies in this effort.

It is my hope that this document will provide a useful point of departure for the combined efforts of natural resource managers, conservation organizations, and the concerned public toward the goal of securing the future viability of North America's Neotropical migrants.



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Many people contributed in a variety of ways to making this project a reality. Alan Christensen and the other members of the Neotropical Steering Committee in Region 1 deserve credit for their vision and persistence in conceiving of the idea for a regional handbook devoted to Neotropical migrants. Alan and many of the other committee members (Dan Casey [Montana Department of Fish, Wildlife, and Parks], Steve Gniadek [Glacier National Park], Sally Hejl [Forestry Science Laboratory, Missoula], Dick Hutto [University of Montana], Dave McCleerey [Bureau of Land Management, Missoula], Harvey Nyberg [Montana Department of Fish, Wildlife, and Parks], Chris Paige [Forestry Science Laboratory, Missoula], and Nancy Warren [Flathead National Forest]) graciously reviewed portions of the manuscript and provided useful literature dealing with the region's avifauna. Rolf Koford (Northern Prairie Wildlife Research Center), Terry Rich (Bureau of Land Management, North Dakota), and Ken Sanchez (U.S. Fish and Wildlife Service, Bismarck, North Dakota) provided hard-to-find literature and checklists; Dave Genter (Montana Natural Heritage Program) and Craig Groves (Idaho Department of Fish and Game) kindly supplied copies of the latilong distributions for birds of Montana and Idaho, respectively.

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# INTRODUCTION

## Identification of the Problem: Forest Fragmentation

Of the 646 species of birds that breed regularly in North America, slightly more than half migrate annually to the Neotropics (Ehrlich, Dobkin, and Wheye, 1988). Nearly 260 of these migrants are landbirds, the majority of which depend upon forests and woodlands either for breeding habitat, wintering habitat, or both. Neotropical migrants include most of the species belonging to many familiar groups: warblers, flycatchers, hummingbirds, vireos, thrushes, swallows, and many of the sparrows and other finches.

An alarming and pervasive decline in the North American breeding populations of many previously common and widespread species of birds has become apparent only within the past several years (Terborgh, 1989; Ehrlich, Dobkin, and Wheye, 1992). Consistent patterns of population decline over the past 40 years were demonstrated by a small number of longterm studies of breeding birds in deciduous forests of the eastern U.S. (reviewed by Askins, Lynch, and Greenberg, 1990). The sites where these studies were conducted typify the characteristics of much of the eastern deciduous forest today - all of the forests were relatively small (<350 ha) and all were spatially isolated from other forested habitats. The population declines documented in these studies confirmed the results of other analyses that found decreased densities or complete loss of many Neotropical migrants in smaller wooded areas when compared to larger forested areas in eastern North America (e.g., Bond, 1957; Forman, Galli, and Leck, 1976; Whitcomb et al., 1981; Ambuel and Temple, 1982; Lynch and Whigham, 1984; Freemark and Merriam, 1986; Askins, Philbrick, and Sugeno, 1987; Robbins, Dawson, and Dowell, 1989). The inescapable conclusion of these and other additional studies is that fragmentation of large, contiguous forests into smaller, isolated patches

results in avian communities of predictably different species composition. Larger forests tend to have more species of "forest-interior nesters" and Neotropical migrants, many of which are entirely absent or greatly reduced in number in smaller forests.

By what mechanisms does the process of habitat fragmentation produce the loss of breeding bird densities and loss of species seen in the forest patches? Surveys of nesting success (Gates and Gysel, 1978; Chasko and Gates, 1982; Temple and Cary, 1988; also see Martin, 1992) and experiments with artificial nests (Wilcove, 1985; Yahner and Scott, 1988) indicate that nest predation is higher and nesting success is lower near the forest edge than in the interior of forests. Fragmentation produces more "edge" relative to "interior" for the resulting forest patch, thus leading to increased nest predation. The most common avian and mammalian nest predators (American crow, Blue Jay, Common Grackle, raccoons, opossums, and domestic cats) all occur in higher densities around forest edges (Bider, 1968; Robbins, 1980; Whitcomb et al., 1981).

In addition to increased susceptibility to predation, Neotropical migrants face another, more subtle threat in fragmented landscapes: the Brown-headed Cowbird. The spread of livestock and European-style agricultural practices in North America over the past 150 years was accompanied by a tremendous expansion of the cowbird's geographic range. The cowbird is an obligate brood parasite that lays its eggs in the nests of other species, leaving the foster parents to rear the cowbird's young, invariably at the expense of the host species own nestlings. In eastern North America, cowbirds are far more abundant in forest edge habitat than in interior forest (Brittingham and Temple, 1983; Rich and Dobkin, in preparation), and brood parasitism by Brown-headed Cowbirds is significantly more frequent near the forest edge (Gates and Gysel,

1978; Brittingham and Temple, 1983; Temple and Cary, 1988; Robinson, 1992).

Forest-interior species and Neotropical migrants in general are highly susceptible to the population impacts produced by increased rates of nest predation and brood parasitism. Compared to resident forest species and short-distance migrants that winter within the United States, Neotropical migrants tend more often to build open cup nests, nest closer to or on the ground, and produce only a single, relatively small clutch, per season (Greenberg, 1980; Ehrlich, Dobkin, and Wheye, 1988).

It is now apparent that forest fragmentation dramatically alters the resulting avian community. The mechanism driving the disappearance of these species could be losses suffered on the breeding grounds as a result of increased rates of nest predation and brood parasitism experienced by Neotropical migrants in general (and by interior-forest nesters, specifically) in "edge-rich" fragments. The consistent population declines documented in longterm studies conducted in small isolated forest patches, however, are not mirrored in the very few longterm studies conducted in large, contiguous forest tracts (reviewed by Askins, Lynch, and Greenberg, 1990). These results lead to the conclusion that increased predation and brood parasitism may account for the disappearance of these species from smaller forest fragments and for regional declines without necessarily producing widespread decline throughout a species entire breeding range.

## Tracking Longterm Population Trends

How then, might changes be detected in avian populations that would signal increases and decreases in numbers throughout a species breeding range? We have only one source of quantitative information regarding regional and range-wide changes in breeding populations of Neotropical migrants and that is the North American Breeding Bird Survey (BBS). First conducted in 1966 (Robbins, Bystrak, and

Geissler, 1986), the BBS is an annual roadside survey of the breeding avifauna in the United States and Canada. BBS data have been used to estimate trends of nearly 370 of the more common species (Robbins, Bystrak, and Geissler, 1986; Droege and Sauer, 1989; Sauer and Droege, 1992). Estimates are based on counts conducted in late May and early June along more than 3,000 established routes, although only two-thirds of these are usually run in any given year. Data collection for each route is accomplished by experienced volunteers using standardized procedures to sample avian populations at 50 stops spaced at 0.8 km intervals along secondary roadways. Routes are run beginning one half hour prior to sunrise, and record all birds detected during three-minute periods within a 0.4 km radius at each stop.

What has emerged from analyses of BBS data is a picture of general stability or slight overall increase in eastern populations of many (but not all) Neotropical migrants during the period 1966-78, followed by a general decline in numbers for most of these species from 1979 to the present time (Robbins et al., 1989). Most permanent residents and species that migrate within North America ("short-distance migrants") did not exhibit a general pattern of decrease. Robbins et al. (1989) further analyzed their data to examine species grouped by their use of forested versus nonforested habitats in both breeding and wintering seasons. Their results provide strong evidence that tropical deforestation is indeed contributing to patterns of decline in Neotropical migrants detected on both regional and continental scales. These results clearly argue that Neotropical migrant landbirds of eastern North America are experiencing problems on their tropical wintering grounds that have become increasingly severe since the late 1970's.

## Problems in Tropical Wintering Areas

While it is clear that breeding populations are suffering adverse impacts during the breeding season in temperate North America, we have been slow to realize the potential crisis faced by

Neotropical migrants on their wintering grounds. The first concerted attempt to assess the biology and distribution of "our" breeding birds on their wintering areas in the Neotropics did not occur until 1977 (Keast and Morton, 1980). That symposium revealed our ignorance not only of the ecological relationships of these species on their tropical wintering grounds but also our lack of knowledge of even such fundamental information as the distribution of many of our most common species in winter. Twelve years later, a similar assessment (Hagan and Johnston, 1992) illustrates how much we have learned in the intervening years, but paints a dire picture of potentially imminent loss of many species' populations, and no less than the complete collapse of the Neotropical migrant system. The problems faced by these birds stem directly from changing patterns of land-use, principally habitat destruction and habitat fragmentation.

The relative stability or increase of many forest-bird populations seen in the first half of the BBS coincided with maximum areal coverage by mature forest in the eastern United States relative to the preceding 100 years (Birch and Wharton, 1982; Brooks and Birch, 1988). Although some significant areas exhibited a net loss in mature forest even in recent years (T.W. Birch, cited in Askins, Lynch, and Greenberg, 1990), forest cover overall remained relatively stable when viewed against the tremendous net loss of tropical forest area (Myers, 1980; Melillo et al., 1986; World Resources Institute, 1989) and the accelerating rate of that loss (Fearnside, 1990). The late 1970's (when many Neotropical species commenced their decline in the BBS data) marked the beginning of extensive forest clearing on the Caribbean slope of Mexico and Central America - areas harboring great concentrations of eastern Neotropical migrants (Robbins et al., 1989; Askins, Lynch, and Greenberg, 1990).

The increasing rate of deforestation within the Neotropics is driven by run-away population growth in the Third World and insatiable consumption by the developed world of the tropics' raw materials and agricultural products

(Ehrlich and Ehrlich, 1991). The proximal mechanism for forest loss is the development of roads that provides access into previously impenetrable forested areas. Such a pattern is exemplified in Costa Rica, for example, where road development into previously inaccessible areas has accelerated the rate of deforestation from less than 2% per year prior to 1977 to more than 7% per year beginning in 1977 (Sader and Joyce, 1988). Most alarmingly, tropical deforestation now usually leads to conversion of these previously forested lands to croplands and cattle pasture instead of returning them to forest. The result is a sustained reduction in total forest area.

More than half of the Earth's species are found only in tropical forests (Wilson, 1988). The destruction of these forests and the consequent loss of Earth's biodiversity is not confined to the Neotropics alone; it has become the norm throughout the planet's tropical forests (Gradwohl and Greenberg, 1988). If however, we focus only on Neotropical migrant landbirds, we can delineate specific geographic areas of greatest concern within the Neotropics. Most of these migrants winter in the areas closest to the United States: Mexico, Guatemala, Belize, Honduras, and the islands of Cuba, the Bahamas, Haiti, and the Dominican Republic. As one proceeds further south or east, the relative proportion of North American migrants in the tropical avifauna diminishes rapidly. There are, nevertheless, numerous species or populations that winter further south in Central America, across northern South America, southward through the Andes, and into the Amazon Basin (see Keast and Morton, 1980; Rappole et al., 1983; Hagan and Johnston, 1992).

The concentration of North American migrants into northern Central America and the Greater Antilles illustrates the disparity in vulnerability of Neotropical migrants on their wintering grounds compared to their breeding grounds (Terborgh, 1980, 1989). Some species that breed across the vast land area of Canada and the United States are compressed into wintering



grounds less than one fifth the area of their breeding range. Two consequences follow from this reduction in area: 1) extensive deforestation in even limited areas of the wintering grounds will impact disproportionately large numbers of birds, and 2) the effects of negative impacts in wintering areas are distributed over very large geographic areas in the breeding season, thus making it very difficult to detect these wintering impacts by surveying birds on their breeding grounds (Rappole et al., 1983; Wilcove and Terborgh, 1984). Hence, it is all the more remarkable and alarming that we have detected the widespread declines in Neotropical migrant breeding populations that are detailed above.

## The Picture in Western North America

As the preceding discussion may have implied, we know far more about the state of Neotropical migrant birds in eastern North America than we do about western populations and species. This is due in large part to the relative paucity of BBS routes in many parts of the West and to the proportionately greater amount of non-urban/suburban habitat in many parts of the West. Given the significant problems of undersampling associated with BBS routes in most parts of western North America, it is disconcerting that a recent extensive analysis of these limited data reveals several sources of concern (Paige, 1990). Paige examined the overall pattern revealed by the 1966-85 BBS data (rather than comparing trends between the early and later periods) and found indications of local or regional declines in 37 species of Neotropical migrants scattered across the West. Although the data indicated that western Neotropical migrants as a group were not declining overall, there was evidence of significant, widespread declines in 19 species of western songbirds (primarily resident species of native grassland and shrubsteppe habitats).

Similarly, insufficient route coverage over much of the West limits the recent attempt to compare trends between periods in BBS data for western populations (Sauer and Droege, 1992).

Only 43 of the 144 species of western Neotropical migrant landbirds that breed in Region 1 appeared frequently enough in the database to project meaningful statistical trends. The results overall for the subset of western populations analyzed point to the general absence of declining trends that were seen in eastern populations.

Taken together, the two assessments of western BBS data indicate that western populations of Neotropical migrants as a whole are faring better than eastern North American populations. In seeking reasons for this apparent dichotomy, one important difference in breeding conditions experienced by eastern and western populations is the nature and extent of forest fragmentation. In general, forest fragmentation in the East is a direct result of humanity's activities and produces a fundamentally different landscape when viewed against fragmented forests in the West. The vast expanses of eastern deciduous forest that existed prior to European colonization have been replaced by extensive agricultural landscapes resulting in only small remnant forest stands throughout a significant portion of the East. Additionally, forest fragments are often surrounded by areas converted to suburban and urban landscapes, terrain that, like most of the agricultural areas, will not regenerate into forest second-growth. Wilcove (1990) aptly described the remnants of eastern deciduous forest as "...islands of green in a paved or plowed sea..."

In contrast, fire and topographic diversity in the West combined in the past to produce a temporally dynamic, naturally fragmented landscape compared to the (previously) extensive and relatively homogeneous eastern deciduous forest. In little more than a century, we have profoundly altered this pattern with fire suppression and extensive timber harvest. Forest fragmentation in the West now results primarily from timber harvest. Nevertheless, landscapes in the West differ fundamentally from the East by virtue of retaining the potential for return to second-growth forest on ecologically-

meaningful time scales. In addition, old-growth forest in eastern North America is virtually nonexistent, but old growth remains a significant (although extremely reduced and highly fragmented) component of some forested landscapes in the West.

Paige's (1990) analysis indicated that in every major habitat type in the West there are key species of Neotropical migrants that warrant our immediate attention and concern (also see Saab and Groves, 1992). Grassland and shrubsteppe habitats in particular may be suffering the greatest problems as demonstrated by widespread declines in their avifaunal communities. As a group, however, relatively few species of Neotropical migrants breed in the arid and semi-arid grasslands and shrublands that cover much of the western United States. By comparison, the vast coniferous forests of the West harbor a significant number of Neotropical migrant species, albeit many fewer than occur in eastern deciduous forests. The most species-rich western habitats for Neotropical migrant landbirds are deciduous woodlands and forests, which occur primarily in canyon bottoms and along streams and rivers. Neotropical migrants comprise a greater proportion of the breeding species in arid-land riparian habitats, than in any other major western habitat (Bock et al., in press). For example, in montane riparian habitats of central Nevada, Neotropical migrants comprise 85 percent of the riparian-dependent breeding species (Dobkin and Wilcox, 1986).

Unfortunately, western deciduous forests and woodlands are among the most threatened habitats in North America (Terborgh, 1989). More than 90 percent of previously extant desert riparian woodland, extremely important habitat for Neotropical migrants both during breeding and migration, has been destroyed by flood control and irrigation projects (Hendrickson and Kubly, 1984). Riparian woodlands throughout much of western North America have been heavily impacted and frequently degraded by livestock grazing (Bock et al., in press).

The apparent lack of overall population declines among western populations of Neotropical migrants may derive from an essential difference in wintering areas used by eastern and western migrants. It has been argued that western Mexico and Guatemala may be the primary or even exclusive wintering locale for many of the Neotropical migrant landbirds that breed in western North America (Barlow, 1980; Fitzpatrick, 1980; Hutto, 1985). Among the many species wintering there, many utilize disturbed habitats, including a wide range of second-growth forest habitats (Hutto, 1986, 1989), although a significant number also use or are restricted to primary forest (Hutto, 1992). If this difference in wintering areas has buffered western migrants from extensive losses due to conditions encountered on the wintering grounds, the situation may soon change. As in other parts of the tropics, habitat alteration in forests of western Mexico increasingly takes the form of conversion to agriculture and of clear-cutting to produce the early successional stages that are used by very few migrant species (Hutto, 1989).

Like the habitats in which they dwell, our picture of the overall status of these birds is badly fragmented. We know with certainty that widespread declines have occurred in many populations that breed in eastern North America. We also know with equal certainty that these declines are neither limited to the eastern half of the continent nor are they limited only to Neotropical migrant species (Ehrlich, Dobkin, and Wheye, 1992).

For most species, we lack sufficient information to differentiate between the alternatives of relative stability and relative decline among populations of Neotropical migrants breeding in western North America. This presents us both with a problem and an opportunity. In the most optimistic scenario, we have the opportunity to begin now to establish research programs that will evaluate the impacts of our management activities on western

populations and to undertake comprehensive, longterm monitoring efforts that will distinguish patterns of population change. To the extent that conditions on the breeding grounds control population trends of these species, actions that we undertake now offer the possibility of preventing or at least mitigating the pattern of losses seen among eastern populations.

Searching for generalizations about population change in "Neotropical migrant landbirds" as a group will prove fruitless, in large part because these species vary greatly in their life histories and in their seasonal distributions (Sauer and Droege, 1992). Success in our efforts will likely be achieved only by combining a focus at the species level with a habitat-based conservation approach.

1. Idaho Panhandle National Forest
2. Clearwater National Forest
3. Nez Perce National Forest
4. Kootenai National Forest
5. Lolo National Forest
6. Bitterroot National Forest
7. Flathead National Forest
8. Lewis and Clark National Forest
9. Deerlodge National Forest
10. Beaverhead National Forest
11. Gallatin National Forest
12. Helena National Forest
13. Custer National Forest
14. Little Missouri National Grassland
15. Cedar River National Grassland
16. Shuyenne National Grassland

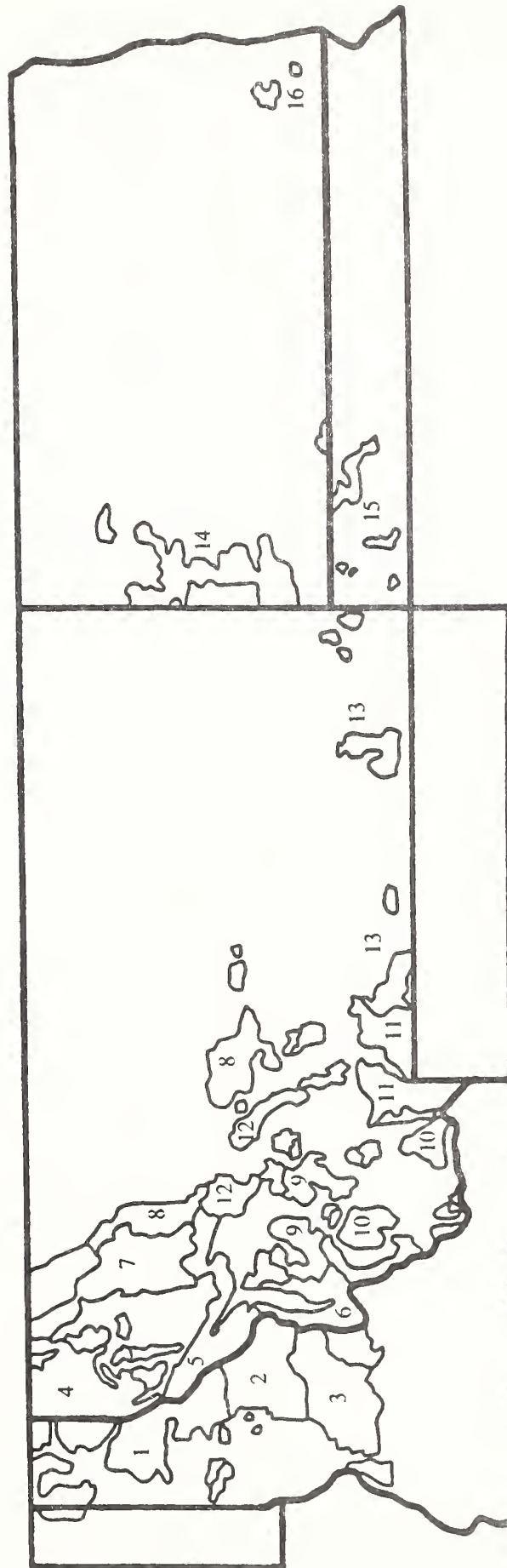


Figure 1. United States Forest Service (USFS) lands of the Northern Rockies and Great Plains.



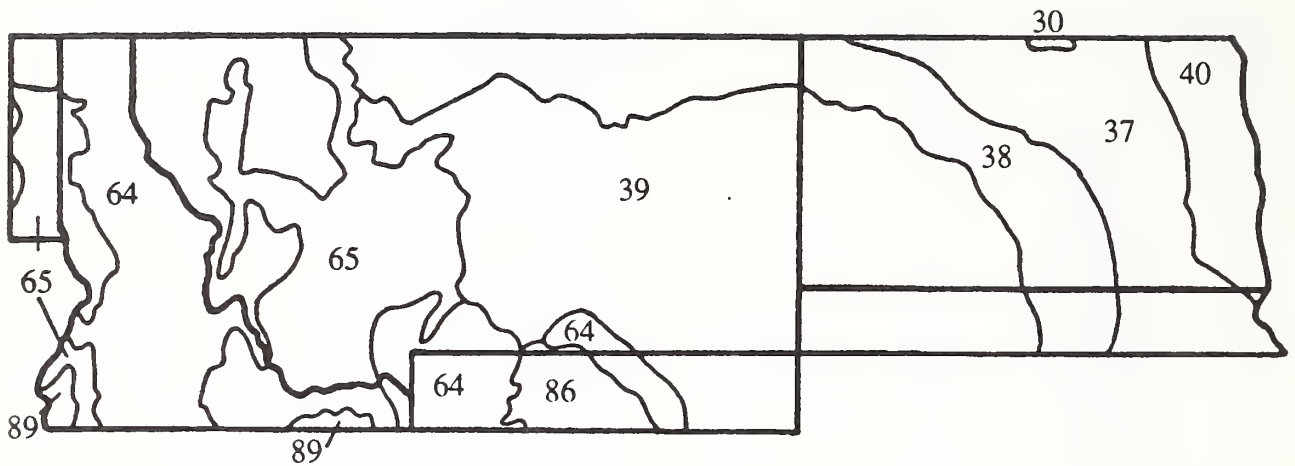


Figure 2. Physiographic regions of the Northern Rockies and Great Plains (based on Robbins, Bystrak, and Geissler, 1986): 30) Aspen parklands, 37) Drift prairie, 38) Missouri Plateau-glaciated, 39) Missouri Plateau-unglaciated, 40) Black prairie, 64) Central Rocky Mountains, 65) Dissected Rocky Mountains, 86) Wyoming Basin, 89) Columbia Plateau.

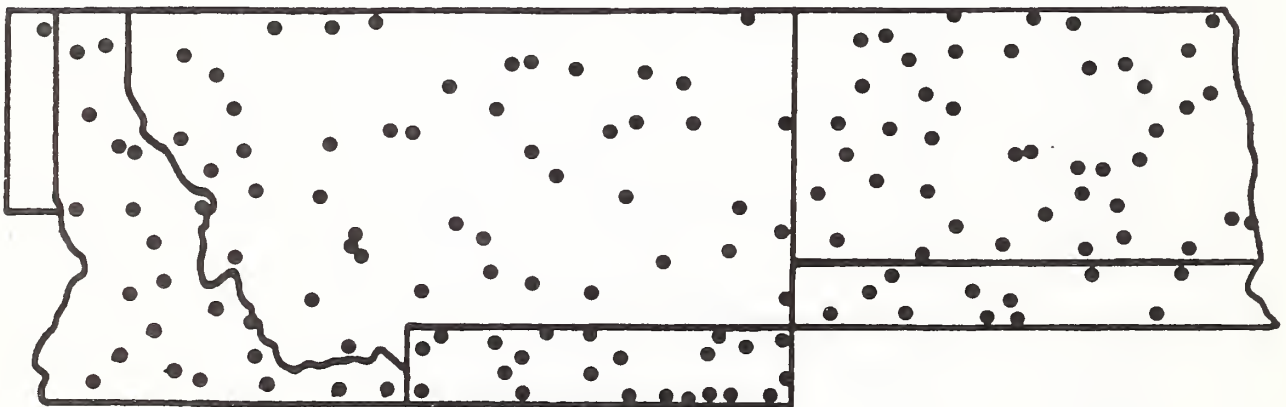


Figure 3. Breeding Bird Survey (BBS) routes of the United States Fish & Wildlife Service in the Northern Region.



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# SURVEY OF MANAGEMENT ACTIVITIES AND IMPACTS IN THE NORTHERN REGION

## CONIFEROUS FORESTS

It is both enlightening and distressing to peruse the workshop proceedings entitled "Management of Western Forests and Grasslands for Nongame Birds," published in 1980 by the U.S. Forest Service (DeGraff and Tilghman, 1980). There is much of relevance, and many of the warnings and recommendations contained therein, especially regarding coniferous forests of the Northern Region and the Pacific Northwest (see e.g., Sanderson et al.; Smith; Miller and Miller; Mannan) are still pointedly relevant today for the region's Neotropical migrant landbirds. In the ten years following publication of the proceedings, the pace and extent of timber harvest in the coniferous forests of the Northern Region and the Pacific Northwest have achieved unprecedented levels. Most dramatic has been the reduction in areal extent of virtually all types of old-growth conifer forests and the extensive use of clear-cutting in timber harvest.

Any attempt to design a comprehensive conservation and management strategy for Neotropical migrants in conifer-dominated landscapes is inexorably confronted by the huge gaps in our knowledge of specific habitat use, nesting and foraging requirements, survival rates, and population viability for the great majority of species. Overlying this general lack of specific information is the additional set of questions addressing how these parameters vary among different silvicultural treatments (Finch, 1991).

Variation in topography and past fire frequency creates an inherently fragmented landscape in montane coniferous-forest ecosystems. This intrinsic quality of the landscape has been augmented greatly by stand-level management impacts (clear-cutting, selection harvest, thinning, fire suppression, and

fire prescription) superimposed on the natural variation. Couple this landscape-scale heterogeneity with highly variable fluctuations in climate between and within years (e.g., Franzreb and Ohmart, 1978; Szaro and Balda, 1979; Smith, 1982; Morrison et al., 1987; Hejl, Verner, and Balda, 1988) and the likelihood becomes vanishingly small for achieving commensurate results among short-term studies of avian communities.

We are only beginning to address the sorts of questions that have been examined in the East, and to assess the kinds of factors that have been implicated as important in population declines of Neotropical migrants inhabiting eastern forest habitats. The explicit question of the impacts of forest fragmentation on birds in western coniferous forests is addressed in only four studies to date (Aney, 1984; Rosenberg and Raphael, 1986; Keller and Anderson, 1992; Hejl, in prep.). Studies in the central Sierra Nevada by Jerry Verner and associates (Hejl, Verner, and Balda, 1988; Verner and Larson, 1989) compared avian communities and vegetation parameters at many sites over a significant geographic area and across silvicultural treatments, but have not yet explicitly incorporated a landscape-level consideration of forest distributions in the analyses.

No studies have been conducted to examine the relationship between cowbird nest parasitism and forest fragmentation in the West. Martin (1988) has made a significant start in evaluating nest predation with his work in small forest fragments of ponderosa pine in central Arizona. His results point to the potential importance of nest predation in fragmented western forests, but many more studies are needed in other types of coniferous forest and in other regions. In Douglas-fir/ponderosa pine forests of the northern Rockies, Hejl (pers. comm.) found a

highly significant association between cowbird abundance and the amount of non-forested (i.e., clearcut) land at the landscape scale. These results are potentially ominous for forest-nesting songbirds and point to the dire need for data to determine whether patterns of nest predation and nest parasitism in western coniferous forests will parallel the effects seen in eastern deciduous forest fragments.

Although a number of recent and current studies in the Northern Region address the question of species distributions among different seral stages and silvicultural treatments, only one (Hejl, in prep.) is framed explicitly and quantitatively in the context of landscape-scale fragmentation to address the role of fragmentation in the patterns being documented. It may well be that in the Northern Region we will never know the full effects of such fragmentation on old-growth, Douglas-fir/ponderosa pine ecosystems, as only relatively small remnant patches remain in the northern Rockies (Aney, 1984; Hejl and Woods, 1991; Moore, 1992).

### Douglas-fir and Ponderosa Pine

As the most economically important and geographically widespread forest types in western North America, Douglas-fir (*Pseudotsuga menziesii*) and ponderosa pine (*Pinus ponderosa*) forests have received the most attention. In order to provide meaningful data, studies must: 1) cover a sufficiently large geographic area to minimize the statistical effects of site-specific peculiarities, 2) include adequate replication across different treatments (silvicultural treatments, stand age, stand size, etc.), including pre-treatment sampling, 3) extend over enough years to incorporate (and hopefully distinguish) the "background noise" of climatically-induced variation in populations. The one additional (and most challenging) feature required of these studies is the explicit incorporation of a landscape context into their design and analysis. To date, only a few studies anywhere in western North America encompass these attributes; in the Northern Region, only

Hejl's work (in prep.) explicitly incorporates adequate landscape-scale considerations.

In northwestern California, Rosenberg and Raphael (1986) specifically investigated the patterns of species distributions and abundances in relation to forest patch size, degree of insularity, and edge characteristics in Douglas-fir forests. Their study encompassed 46 stands ranging in size from 5 to more than 300 ha. The results contrast markedly with similar analyses of eastern deciduous forest avifaunas. Among the subset of species that were sufficiently abundant to be analyzed statistically, the species absent from smaller fragments (i.e., those exhibiting significant area effects) were mostly resident species rather than migrants. Among Neotropical migrant species, only the Sharp-shinned Hawk exhibited such an effect. Unfortunately, only 44 of the 101 species of birds found in the study occurred frequently enough to be analyzed statistically. Hence, for the majority of species we know nothing about the potential influence of fragmentation. The relevance of this study for the Northern Region is uncertain because of substantial climatic and faunal differences from interior Douglas-fir forests.

Aney (1984) surveyed old-growth ponderosa pine/Douglas-fir forest patches in western Montana to examine the relationship between forest remnant size and avian community composition. He found a significant correlation between species richness and forest size, thus paralleling the results seen in remnant forest patches of eastern deciduous forest. Among the Neotropical migrants that appeared to exhibit significant area effects were Sharp-shinned and Cooper's Hawks, Williamson's Sapsucker, *Empidonax* flycatchers, Brown Creeper, and Solitary Vireo. The results of Aney's (1984) study are limited by the strongly skewed sample of available patch sizes (14 of the 19 stands were smaller than 7 ha, and only one stand larger than 40 ha could be located), and by having been conducted over only a single field season. In spite of these important shortcomings, this study points to the potential



for adverse impacts on Neotropical migrants in the Northern Region that result from old-growth fragmentation.

Preliminary results have been published (Hejl and Woods, 1991) for the first year of a three-year study designed to compare avifaunas in remnant old-growth Douglas fir/ponderosa pine forests and older rotation-age forests in western Montana and adjacent Idaho. Although species richness was similar among sites, a greater number of species was found in old growth overall (14 of 68 species were found only in old growth; 7 species occurred exclusively in rotation-age stands). The survey of 16 old growth (200+ yrs) and 16 rotation-aged (80-120 yrs—the oldest managed stands under current prescriptions) stands revealed strong, site-specific differences—emphasizing the danger of drawing inferences from studies encompassing only a few sites. Although results from this study generally agreed well with those of Mannan and Meslow (1984), disparities between them (and Aney, 1984) likely reflect differences among years (each study analyzed data from only a single year).

Several species of Neotropical migrants exhibited significantly greater abundances in old growth (Hejl and Woods, 1991; Hejl, in prep.), including Hammond's Flycatcher, Swainson's and Hermit Thrushes, Townsend's and Yellow-rumped Warblers, and Western Tanager. (Northern Flicker and Pileated Woodpeckers also were significantly more abundant in old growth.) Northern Goshawk and Winter Wren occurred only in the old growth stands. Only three Neotropical migrants were significantly more abundant in rotation-age stands: Dusky Flycatcher, Solitary Vireo, and Chipping Sparrow. Brown-headed Cowbirds also were significantly more abundant in the rotation-age stands. Four Neotropical migrants typically associated with earlier seral stages were absent from old growth but present in rotation-age stands: Mourning Dove, Cedar Waxwing, Western Meadowlark, and Vesper Sparrow. Within the old-growth stands, the presence of several species was attributed in large part to the

presence of large snags—key ecological features of old-growth forest that were entirely absent from rotation-age stands.

A recently completed four-year study in Douglas-fir forests of southwestern Montana (Moore, 1992) compared avian communities among old-growth (four stands [70-300+ yrs]), rotation-age (four mature stands [65-145 yrs]), shelterwood cut (one stand [65-145 yrs]), and clearcut (one stand) stands. The landscape context was typical of the region—fragmentation resulting from the dispersion pattern of harvest units. As in the study by Hejl and Woods (1991), no difference was found in species richness between old and mature stands but there were significant differences among species. Not surprisingly, the shelterwood (selection cut) provided postharvest habitat with greater abundances and species richness than the clearcut.

The importance of the landscape-level scale of heavy fragmentation is epitomized by the relatively greater abundance found for cowbirds in the old-growth stands compared to the other treatments! The degree of fragmentation in this study likely obscures patterns for some individual species and creates misleading patterns for others. For example, although Williamson's Sapsucker was associated with old-growth stands having large-diameter snags, and Hammond's Flycatcher was significantly more abundant in old growth, both American Robin and Chipping Sparrow also were significantly more abundant in old growth. In fact, Moore (1992) documents more similarities than differences between old-growth and mature avifaunas (both of which contrasted strongly with harvest units), most likely due in large part to small stand sizes embedded within a heavily fragmented landscape; Mountain Chickadee, Red-breasted Nuthatch, Brown Creeper, Ruby-crowned Kinglet, Swainson's and Hermit Thrushes, Warbling Vireo, Yellow-rumped Warbler, and Western Tanager did not differ in relative abundances between old-growth and mature stands, but all were significantly more abundant there than in the harvest units. Not

surprisingly, White-crowned Sparrow and Cassin's Finch were significantly more abundant in the harvest units.

In similar old-growth Douglas-fir/ponderosa pine habitat in northeastern Oregon, Mannan and Meslow (1984) compared avian communities in four old-growth stands (200+ yrs) and four rotation-age stands (85 yrs—the oldest managed forest stands in the region). In their three year study, the presence of large snags in old growth and absence in rotation-age stands translated into differences in presence and abundance for hole-nesting species, most markedly for Pileated Woodpecker, Vaux's Swift, and sapsuckers. Not surprisingly, ground foraging species were better represented in the rotation-age stands. Northern Goshawk, Flammulated Owl, Red-naped and Williamson's Sapsuckers were found only in the old-growth stands; Mourning Dove and Calliope Hummingbird were found only in the rotation-age stands.

Mannan and Meslow (1984) found significantly greater abundances in old growth for Brown Creeper, Red-breasted Nuthatch, probably Hammond's Flycatcher (identification was apparently confounded with Dusky Flycatcher), Golden-crowned Kinglet, Swainson's, Varied, and Hermit Thrushes, Townsend's and MacGillivray's Warblers. In rotation-age stands, Dusky Flycatcher, Ruby-crowned Kinglet, Chipping Sparrow, Dark-eyed Junco, Brown-headed Cowbird, and Cassin's Finch were all significantly more abundant.

Studies conducted in ponderosa pine forests of the southern Rockies similarly address the question of silvicultural treatment on avian community structure (Szaro and Balda, 1979; Brawn and Balda, 1988), although there are significant differences in avian species composition compared to ponderosa pine forests in the Northern Region. Analyses focus on the great variation in avian populations among years due in part to variable weather patterns (Gaud, Balda, and Brawn, 1986; Szaro and Balda, 1986; also see Hejl, Verner, and Balda, 1988) and to

variation in avian foraging behavior among years (Szaro, Brawn, and Balda, 1990). As elsewhere, the importance of snag retention in ponderosa pine forests of the southern Rockies has been emphasized for a number of Neotropical migrant species (Balda, 1975; Cunningham, Balda, and Gaud, 1980).

A variety of additional studies comparing avian communities among contrasting silvicultural treatments in various types of coniferous forest offer little insight into the questions they attempt to address (e.g., Ramsden, Lyon, and Halvorson, 1979; Peterson, 1982; Medin, 1985; Medin and Booth, 1989). These studies suffer from lack of replication among treatments (some sample only a single site per treatment or provide "pseudoreplication" by simply subdividing a single site into two or more plots) or from lack of temporal perspective (sampling was conducted in only a single season and site-specific pretreatment sampling was generally lacking), or both; several studies that sampled across years are compromised by statistical analyses that fail to properly assess between-year variation. Prior to 1980, the importance of forest patch size in a landscape context simply was not considered in most studies of avian communities in western coniferous forests (but see Thompson, 1978).

## Other Coniferous Forests

Although our knowledge of avifaunas in Douglas-fir and ponderosa pine forests in the Northern Region is at best only fragmentary, we know even less about the dynamics of avifaunas in other types of forests.

Keller and Anderson (1992) explicitly examined the effects of fragmentation on birds in subalpine forests of southeastern Wyoming. Only 16 species of breeding birds were detected in unfragmented and fragmented stands of Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*). During the two years of the study, a marked decrease in overall avian numbers occurred between years, which



was attributed to climatic factors. Site-specific differences appeared to be more important than fragmentation effects in affecting species distributions between treatments, with the exception of Brown Creepers, which never occurred in fragmented stands. Given the comparatively harsh environmental conditions experienced at high elevations, the results of this study are perhaps not surprising. Significant differences in abundance did occur between treatments: among Neotropical migrants, Yellow-rumped Warbler, Hermit Thrush, American Robin, (and Brown Creeper) were significantly more abundant in unfragmented stands than in fragmented forests. Only Pine Siskins were more abundant in fragmented stands. Overall species composition in stands interrupted by small clearcuts was similar to the composition in unfragmented forests, aside from the loss of Brown Creepers.

Keller and Anderson (1992) argue that the loss of resources by clear-cutting in subalpine forests may convert already marginal habitats into wholly unsuitable nesting areas. Their results are consistent with those of Franzreb and Ohmart (1978) and Mannan and Meslow (1984) for Brown Creepers, Hermit Thrushes, and Red-breasted Nuthatches, suggesting that fragmentation in these subalpine forests produces avifaunas that are more similar to managed stands than to unlogged old growth.

In the Northern Region, the most significant study to date outside of Douglas-fir/ponderosa pine forest was conducted in old-growth western larch (*Larix occidentalis*)/Douglas-fir in northwestern Montana (Tobalske, Shearer, and Hutto, 1991). Within a heavily fragmented landscape, they compared avian communities in four small clearcuts, three small partial cuts, an unlogged forest fragment of 134 ha, and an unlogged research natural area of 339 ha. All snags and all deciduous trees (birch, cottonwood, and aspen) were retained in clearcuts and partial cuts. Although 10 replicates were assessed within each treatment, many species (19 of 51 species) occurred too rarely to analyze statistically.

Golden-crowned Kinglet, Swainson's and Varied Thrush, and Townsend's Warbler were significantly more abundant in unlogged forest than in the cutting units (Tobalske, Shearer, and Hutto, 1991). Only Tree Swallow, Dark-eyed Junco, and Pine Siskin were significantly more abundant on partial and clearcut sites compared to the two unlogged sites combined. However, the importance of landscape-scale fragmentation can be seen in the striking similarities found in abundances of several species (e.g., Golden-crowned and Ruby-crowned Kinglets, American Robin, Varied Thrush, Townsend's Warbler, Chipping and Fox Sparrows) in partial-cut sites and surrounding (i.e., fragmented) unlogged forest when contrasted with the larger, more intact, unlogged forest on the research natural area. Golden-crowned Kinglets were far more abundant than Ruby-crowns in the research natural area but not in the unlogged fragment, and only Ruby-crowned Kinglets occurred in the clearcut treatments. These results are consistent with other studies indicating that Golden-crowned Kinglets are more sensitive to forest fragmentation in the Northern Region than are their congeners.

Echoing the earlier work of McClelland and Frissell (1975), Tobalske, Shearer, and Hutto (1991) emphasize the importance of retaining conifer snags and all deciduous trees (both live and dead) in cutting units. They also found (as did Franzreb [1977] for House Wren and Dark-eyed Junco) that the retention of logging slash supplied critical cover, foraging, and nesting sites for some species. Tobalske, Shearer, and Hutto (1991) provide a cogent discussion of the role of fragmentation and the lack of sufficient replication in decreasing the ability of studies such as theirs to fully address the effects of silvicultural treatments on these avian communities. These limitations result, in part, from the great annual variation in populations of some species (such as Pine Siskin) and the numerical rarity of many species. In their study, rarity precluded analysis of nearly 40 percent of the detected species.

Avian species composition in relation to forest age also has been examined in Douglas-fir/western hemlock (*Tsuga heterophylla*) forests on the west slope of the Cascades (Manuwal and Huff, 1987 and references cited therein), but the presence of important component species that do not occur in the Northern Region severely complicates any attempt to extrapolate their results to the northern Rockies.

## Fire and Avian Community Response

Few detailed studies have been conducted to explore the effects of fire on birds in western coniferous forests. Most are anecdotal and short-term having been conceived opportunistically in response to forest fires. There is a critical need for well-planned, statistically viable studies of avian community response to fire in all the region's coniferous forest ecosystems. Of even greater urgency is the need for research designed to address the impact of postfire salvage logging on birds that nest and forage in these postfire habitats. Such studies are entirely lacking to date.

In one of the better designed analyses, Skinner (1989) examined several postfire conditions in lodgepole pine (*Pinus contorta*) forests and ecotones in northwestern Wyoming. Within a heavily mosaiced landscape, she examined 22 plots for passerines (also hummingbirds and woodpeckers) in lodgepole/sagebrush and lodgepole/riparian ecotones in a single season. Her results typify the complexity of seral stage avifaunal dynamics. Shrub and ground foraging species were significantly more abundant and diverse in 2-yr postfire ecotones compared to unburned ecotones. Aerial foragers and salliers were more abundant in both 2-yr and 6-yr postfire ecotones compared to unburned ecotones. Within these broad guild designations, many species did not conform to the preceding generalities, leading Skinner to emphasize the need to examine species on an individual basis rather than combining species into guilds.

In a recently completed study (Hutto, in prep.; pers. comm.), the effects of intense forest fires in the Northern Region during 1988 were surveyed across 38 different mixed-conifer forests in the two following years. Many avian species that are well known as early postfire associates (e.g., Black-backed Woodpecker) were virtually restricted to these burned forests. Most surprisingly, several Neotropical migrant species (including Olive-sided Flycatcher, Mountain Bluebird, and Chipping Sparrow) were found to occur significantly more frequently in early postfire habitats than in any other forested habitats in the northern Rockies. For Mountain Bluebirds in particular, these habitats appear to be critical for nesting populations. This study clearly indicates the tremendous potential for adverse impact on many avian species that could result inadvertently from postfire salvage logging.

Bock and Bock (1983) analyzed the effects of prescribed burns in ponderosa pine forests and pine-grassland savannah in the Black Hills of South Dakota. In the first and second years following fire, species composition did not differ between burned and unburned control plots. Significant differences in relative abundances were seen in seven Neotropical migrants (American Robin, Mountain Bluebird, Solitary Vireo, Yellow-rumped Warbler, Western Tanager, Dark-eyed Junco, and Chipping Sparrow) which were more abundant on burned plots than on control plots in the first year postfire, although in the second year only the Vesper Sparrow was more abundant on burned plots. In general, their results are similar to those of other earlier studies (cited by Bock and Bock, 1983) in suggesting that the significantly increased abundances seen in the initial postfire breeding season were likely due to an increased food supply resulting from burning.

In western Montana, Lyon and Marzluff (1985) attempted to compare avifaunas in unlogged Douglas-fir forest and similar forest that experienced an uncontrolled burn. They



examined two sites in the year of the fire and again two years postfire. Little change in total numbers of birds or in species richness was found but no detailed analysis was performed at the species level. Their study is further complicated by postfire salvage logging and by post-breeding season movements of birds into the burned areas, attracted perhaps as a result of increased foraging opportunities presented by elevated insect densities.

### Effects of Livestock Grazing

Virtually nothing is known about the potential influence of livestock on Neotropical migrants in western coniferous forests. We know only that no native ungulate herds in any way comparable to sheep or cattle coevolved with the vegetation of these forests. Hence, we should expect that domestic livestock have exerted a considerable effect on these ecosystems, in terms of vegetation composition and structure (Bock et al., in press). Birds most likely to be affected negatively by livestock grazing in montane forests are species (such as Nashville Warbler, Fox Sparrow, and Lincoln's Sparrow) that are dependent on herbaceous and shrubby ground cover for nesting or foraging.

Studies are needed both during nesting and migration periods to examine the longterm and short-term effects of grazing. Comparisons should be conducted among replicated forested stands with known differences in grazing regimes or grazing histories. Quantitative assessment of vegetation structure and composition must be an integral part of such studies.

### Impacts of Pest Management

The control of insect pest outbreaks with the use of chemical control agents is a common silvicultural practice. Many Neotropical migrants inhabiting conifer forests feed almost exclusively on lepidopteran larvae and adults during much of the breeding season and rely heavily on these insects for feeding their nestlings (Ehrlich et al., 1988; Holmes, 1990).

Several species of wood warblers and other Neotropical migrants are well known as specialists on cyclical "outbreak" types of forest insects and their populations closely track these outbreaks (see e.g., Morse, 1989). Similar relationships likely exist among some species nesting in western coniferous forests but this question is unexplored.

Impressive quantities of insect pests at all life stages (eggs, larvae, pupae, and adults) are routinely consumed by forest birds (e.g., Torgersen, Mason, and Campbell, 1990) but this fact appears to be largely unappreciated by forest managers. Insectivorous birds, foliage-foraging ants, wasps, and some small mammals are major predators of insect pests in temperate forests. The general effectiveness of birds as control agents of forest insects is often underestimated by focusing on their impact at the height of insect outbreaks. Birds in temperate forests appear to depress or maintain insect numbers at low levels and probably extend the number of years between outbreaks in irruptive pest species (reviewed by Holmes, 1990).

Insectivorous birds and foliage-foraging ants both respond positively to the presence of standing and downed dead trees (Torgersen, Mason, and Campbell, 1990). Hence, retention and recruitment of snags will enhance populations of these natural enemies and augment their effectiveness as natural control agents of insect pests. For many insectivorous birds, the potentially devastating impact on food supplies that presumably results from pest control spraying is a topic in need of study.

The use of selective herbicides to control growth of deciduous trees and shrubs in managed conifer forests is another topic that is unexplored in terms of its impact (through the elimination of required nesting and foraging cover) on Neotropical migrants. A secondary impact of these control measures is the reduction of food resources (insects) for insectivorous birds by virtue of the diminished habitat that supports many insects.

## Summary and Recommendations

Avian communities vary in structure and composition and our perception of these communities is often determined by the temporal and spatial scales we use to delimit them (Wiens, 1989a, b). Consequently, a study-by-study assessment of results for Neotropical migrant species yields sometimes contradictory information and can thoroughly confound attempts to generalize at the species level. In spite of these problems, several salient points for natural resource managers should be noted.

In clear-cut harvesting, the importance of retaining snags, standing live trees, substantial slash, and live deciduous trees (if present) has been emphasized repeatedly (Balda, 1975; Franzreb, 1977; Cunningham, Balda, and Gaud, 1980; Miller and Miller, 1980; Bull et al., 1980; Tobalske et al., 1991; Moore, 1992). Many studies provide clear evidence that it is far more beneficial to retain larger snags rather than smaller ones (McClelland et al., 1979; Mannan and Meslow, 1984; Hejl and Woods, 1991).

We know very little about the impacts of forest management activities on the productivity of Neotropical migrants. Wherever possible, we should move beyond collecting data that simply indicate presence or absence of species and begin to more directly address real population parameters by measuring population productivity (nesting and fledging success) across different management treatments. Attempts to deduce the health and viability of populations based solely on surveys of the number of territorial birds will mask the underlying reality of population sinks in which reproduction is so low that it fails to compensate for mortality (e.g., Gibbs and Faaborg, 1990; Robinson, 1992). Intensive single-species studies that measure productivity across different management treatments will provide the greatest insight into the effects of forestry practices on breeding populations of Neotropical migrants.

Although species may sometimes be conveniently grouped into functional ecological guilds based on shared ecological similarities (nesting location, foraging mode, etc.), they must not be viewed simply as interchangeable units. Each species requires individual assessment for its response to management activities in forest ecosystems, and geographic variation in these responses among populations within species should be expected as the norm, not the exception. To focus on community-wide measures (such as avian species richness or species diversity) for assessment of management impacts is to miss the point of species-specific patterns and responses. Replacement of species that are sensitive to habitat fragmentation or associated with rare or diminishing habitats by species that thrive in human-altered landscapes is not a desirable outcome—even if overall species richness or diversity remains the same.

In designing research projects to address the conservation and management of Neotropical migrants in western coniferous forests, the following elements are essential:

- 1) it is imperative that we incorporate a landscape-level scale of habitat variation into our research design and our management plans,
- 2) longterm studies of at least 5-10 years duration are needed in order to encompass even a minimally reasonable range of background fluctuations driven by climatic variation,
- 3) sampling must cover a sufficiently large geographic area to minimize the statistical effects of variation resulting from site-specific differences, and
- 4) adequate replication across different treatments must be an integral part of any study and ideally should include pre-treatment sampling.



## DECIDUOUS FORESTS

The most widespread deciduous forests in the Northern Region are riparian woodlands, which vary from extensive floodplain forests associated with large rivers on the plains to narrow bands of aspen (*Populus tremuloides*) woodlands and willow (*Salix* sp.) thickets along small streams in the mountains. The other major types of deciduous forests in the region are montane aspen forests in the Rockies, wooded draws in badland areas of the westernmost plains, and planted shelterbelts scattered throughout the northern plains.

As is true for most birds in western coniferous forests, our knowledge of species-specific habitat use, nesting and foraging requirements, survival rates, and population dynamics is quite fragmentary for most species associated with western deciduous forests. Overlying the general lack of specific information is the additional set of questions addressing how avian life-history parameters and ecological relationships vary among different management activities, principally livestock grazing and timber harvest.

### Riparian Woodlands and Forests

Although constituting less than one percent of western landscapes, riparian forests and woodlands harbor the most species-rich avifaunas of all the major habitats found in the western United States (Knopf et al., 1988). Neotropical migrants usually comprise the majority of species in these riparian communities. For example, 60 percent of Idaho's Neotropical migrant landbirds are associated with riparian habitats (Saab and Groves, 1992), and 82 percent of all nesting species in northern Colorado use riparian areas (78 percent of Colorado's landbird species are Neotropical migrants; Knopf, 1985). In montane riparian communities in central Nevada, 85 percent of the riparian-dependent breeding species are Neotropical migrants (Dobkin and Wilcox, 1986).

Unfortunately, western riparian ecosystems are focal points of maximum potential conflict among competing users for livestock grazing, timber harvest, recreation, channelization for flood control, and water diversion for agricultural use, power generation, and domestic consumption (Thomas, Maser, and Rodiek, 1979). In the western United States, the negative effects of human impacts on Neotropical migrants are likely to be most dramatic in these riparian woodlands which support the greatest diversity and abundances of Neotropical migrants in the West both in the breeding season and during migration.

Aside from the sometimes expansive floodplain forests in the eastern portion of the region, riparian habitats in the Northern Region tend to be narrow and highly linear. The effects of forest fragmentation seen in eastern deciduous forests therefore might be expected to be much less important for these avifaunas, and the question is virtually unexplored. The only study to address the effects of forest fragmentation on birds in western riparian areas was conducted in montane riparian habitats of central Nevada (Dobkin and Wilcox, 1986). Their results clearly indicate that most riparian species exhibit area-dependent distributions, and that many species are lost from smaller riparian fragments. No assessment of forest fragmentation on avian communities has been conducted in the more expansive floodplain forests of the northern Great Plains where the negative effects of fragmentation should most closely parallel the experience of birds in eastern deciduous forests.

There are no longterm studies that characterize avian communities and their population fluctuations in relatively undisturbed riparian habitats of the Northern Region. Such studies are sorely needed to serve as baselines against which comparisons can be made with riparian communities subjected to various management activities. Especially in the northern plains, we have only "snapshot" qualitative pictures of these rich communities (e.g., Kroodsma, 1973; Tubbs, 1980; Hopkins,

Cassel, and Bjugstad, 1986). Multi-year studies encompassing a broad range of intact forest sizes and spanning a broad geographical distribution are urgently needed. Equally important is the need for detailed assessments of the use of riparian areas in the region by birds during migration. As critical as these habitats are for breeding populations, they are of paramount importance as migration corridors that provide cover and food, especially during autumn migration. Field studies are desperately needed to quantify these relationships.

Most of the work examining riparian avifaunas has been in the context of livestock grazing impacts on riparian vegetation and the consequent implications for breeding birds. In spite of the contentiousness of this issue, only a handful of studies have been conducted that compare different grazing regimens or histories, and these are reviewed in detail by Bock et al. (in press). Many of these studies suffer incurably from the combination of short-term perspective (i.e., conducted for only a single season) and complete lack of replication among treatments (e.g., Medin and Clary 1990, 1991). Little insight can be gained from such narrowly focused and poorly designed studies (Szaro, 1991). In spite of the general paucity of adequate research, a number of consistent generalities regarding riparian avifaunas can be drawn from the small number of well executed studies.

The presence or absence of many Neotropical migrant species in riparian habitats is intimately tied to the complexity and density of vegetation structure, especially in the shrub and herbaceous layers. Cottonwood-dominated habitats at lower elevations tend to have the greatest layering of vegetation and support the richest avifaunas (Knopf, 1985; Finch, 1989a, b). In riparian zones, the most obvious effect of livestock grazing on vegetation is to remove (to varying degrees depending on the timing, duration, and number of livestock) the lower vegetation layers. This effect is compounded by continued grazing which prevents recruitment

by woody species and leads to decadence and senescence of the trees and shrubs. The effects of prolonged use by cattle in most riparian habitats of the western U.S. are not subtle and can be easily seen. Such impacted riparian areas support plant and animal communities that are both structurally and taxonomically impoverished relative to intact riparian habitats. Hence, it should come as no surprise that many Neotropical migrants are strongly affected by livestock-induced changes in riparian vegetation (Bock et al., in press).

The lack of recruitment of young trees in cottonwood-dominated floodplain forests is an increasingly common phenomenon that results singly or in combination from altered stream flows, intense livestock grazing, and invasion of exotic woody plant species, especially Russian-olive (*Elaeagnus angustifolia*) (Olson and Knopf, 1986; Knopf and Scott, 1990). The lack of tree regeneration within aging cottonwood forests will inexorably lead to the loss of large snags and live trees without replacement, resulting in significant declines of cavity-nesting species (Sedgwick and Knopf, 1990).

Birds that are most directly and negatively affected by livestock in riparian areas are species that nest or forage in dense shrub or herbaceous ground layers (Bock et al., in press). Among these species are Willow Flycatcher, Wilson's Warbler, Lincoln's and White-crowned Sparrows in the central Rockies (Knopf, Sedgwick, and Cannon, 1988; Schulz and Leininger, 1991), Common Yellowthroat and Yellow-breasted Chat in northeastern Colorado (Sedgwick and Knopf, 1987), Nashville and MacGillivray's Warblers, Common Yellowthroat, and Lazuli Bunting in western Montana (Mosconi and Hutto, 1982). Veery, Savannah and Fox Sparrows, and many others could be added to this list but adequate studies are still lacking.

Some species that require open areas for foraging do respond positively to livestock grazing in riparian habitats (e.g., Killdeer,



American Robin, and Brewer's Blackbird), but these are generally species that are widespread and occur more commonly in other types of habitats, or abundant species that are broadly distributed in human-altered habitats.

An important and largely unexplored ancillary impact of cattle in riparian areas results from their relationship to Brown-headed Cowbirds. Several studies currently in progress (such as J. Sedgwick's work on Willow Flycatchers, pers. comm.) are finding unusually high incidences of cowbird nest parasitism associated with the presence of cattle in riparian areas. The cattle themselves serve as attractors for the birds, and the creation of open, sparsely vegetated ground provides favorable foraging conditions for cowbirds and results in their increased use of riparian areas (Laymon, 1987).

### Nonriparian Aspen Woodland

Aspen occurs in many types of western forests but only rarely occurs in extensive stands outside of riparian habitats, except in Colorado and Utah. Within conifer-dominated landscapes of the central and northern Rockies, aspen stands harbor more diverse breeding assemblages of birds than do coniferous habitats (Salt, 1957; Flack, 1976; Winternitz, 1976). Most studies of birds in nonriparian aspen stands have been conducted outside of the Northern Region (Debyle and Winokur, 1985), and indicate that species abundances and species richness vary greatly in conjunction with habitat structure, woody species composition, and landscape context (e.g., Flack, 1976).

In response to the recent commercial demand for aspen, a comprehensive examination of the effects of clear-cutting and consequent forest fragmentation for aspen avifaunas was initiated recently in the central Rockies (Finch and Reynolds, 1988). This well-designed longterm study includes wide geographic coverage by encompassing sites in Wyoming and Colorado, abundant replication, and three years of pre-treatment analyses. Goals of the

study are to evaluate the relationship of avian community composition and density to aspen stand age, woody species composition, and the size, shape, and landscape distribution of clearcuts.

Results of the first year of their study (Finch and Reynolds, 1988) comparing "large" (>40 ha) uncut aspen, mixed aspen/subalpine conifer (Engelmann spruce/subalpine fir), and uncut subalpine conifer stands indicated that nearly two-thirds of the bird species that use aspen also occur in subalpine coniferous forest. As is typically the case for similar studies in coniferous forests, less than half of the species detected were sufficiently abundant to allow statistical comparisons among sites.

The average total number of birds per plot was highest in aspen, followed by mixed stands, followed by spruce/fir stands. Species richness followed the same pattern but did not differ statistically among the three stand types, although many species exhibited significantly different abundances among the three. In aspen stands, Red-naped Sapsucker, Western Wood-Pewee, Dusky Flycatcher, Tree Swallow, House Wren, Warbling Vireo, MacGillivray's Warbler, and Lincoln's Sparrow, were significantly more abundant. Of these, the sapsucker, pewee, flycatcher, and wren were found almost exclusively in aspen stands. In addition, Black-capped Chickadee, Orange-crowned Warbler, and Brown-headed Cowbird were identified as potential obligate aspen associates by virtue of their abundance in aspen and mixed stands relative to spruce/fir stands. Only Red-breasted Nuthatch was more abundant in mixed stands than in either aspen or conifer stands. Olive-sided Flycatcher, Golden-crowned Kinglet, and Swainson's Thrush, were most abundant in the spruce/fir stands with the Kinglet found nearly exclusively there (Finch and Reynolds, 1988).

Several species exhibited significant differences in relative abundance among aspen "subtypes"—stands with different understories (herbaceous, small shrub, and tall shrub). Thus

understory characteristics within pure aspen stands can significantly affect species distributions among aspen stands.

Reduction of uncut aspen stands and conifer invasion of aspen stands were identified as likely to negatively affect the abundances of at least Red-naped Sapsucker and Warbling Vireo. Clear-cutting may improve some aspen subtypes by creating a mosaic of different structural stages, which will be differentially attractive across a suite of avian species. However, clear-cutting may degrade other aspen subtypes by removing or diminishing key habitat components required by obligate- or near-obligate aspen-nesting birds (Finch and Reynolds, 1988).

In a somewhat similar study in Colorado, Scott and Crouch (1988a) examined two stands in each of five overstory categories from pure aspen through mixed aspen/conifer to pure conifer. Although the study included two years of data, it is impossible to disentangle between-year differences from treatment effects because the data were combined. The authors noted summer livestock grazing on their plots but were unable to evaluate its possible impact; the potential influence of an obviously heterogeneous landscape also was not addressed.

Scott and Crouch (1988a) found that mixed stands had the highest avian species richness. Pure or nearly pure aspen harbored significantly greater abundances of House Wren, American Robin, Warbling Vireo, Yellow-rumped Warbler, and Dark-eyed Junco. Significant negative correlations with pure or nearly pure aspen were found for Brown Creeper, Ruby-crowned Kinglet, Hermit Thrush, Western Tanager, and Pine Siskin—species that are normally associated with coniferous forests.

In a complementary study in Colorado, Scott and Crouch (1988b) examined three sizes of clearcuts (all under 7 ha) with 10 replicates each across five age-classes (6, 7, 8, 9, and 10 years postharvest), and included 30 plots in uncut

aspen. Unfortunately, the study lasted only one season, and it is difficult to evaluate the landscape context and size of “uncut” controls. Not many differences in relative abundances were found among species that occupy a range of successional stages. Two species (Hermit Thrush and Solitary Vireo) normally associated with more mature habitats were significantly more abundant in the oldest clearcuts. However, birds that occupy large territories and many less common species were not sampled in numbers sufficient to determine their responses to clear-cutting.

The importance of considering the influence of surrounding coniferous forest on the composition of deciduous forest avifaunas is well illustrated by the work of Li and Martin (1991). In the southern Rockies of Arizona, they examined aspen with a coniferous overstory in a mixed-conifer forest dominated by ponderosa pine. Conifer snags were rare both in the ponderosa pine forest and in the aspen/pine woodland. As a result, aspen harbored an extremely diverse (14 species) assemblage of cavity-nesters (including Red-naped and Williamson’s Sapsuckers, Cordilleran Flycatcher, Brown Creeper, House Wren, and Western Bluebird), several of which normally are associated only with coniferous forest.

## Deciduous Nonriparian Draws

Prairie thickets consisting of upland native woodlands (commonly known as “wooded draws”) occur from eastern Montana through the Dakotas as island-like habitats surrounded by prairie grasslands and agricultural fields. Wooded draws are characterized by small trees, predominantly green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), and boxelder (*Acer negundo*) with substantial shrub understories. These woodlands are often subjected to intensive livestock grazing (Faanes, 1987) and are widely threatened by energy development activities, especially by strip-mining for coal (Hopkins, Cassel, and Bjugstad, 1986).



Although they cover less than one percent of the northern Great Plains (Bjugstad and Sorg, 1984), wooded draws harbor disproportionately rich avifaunas compared to other plains habitats. For example, in southeast Montana, Dubois (1979) found that deciduous draws supported the highest number of species and greatest breeding abundances of birds when compared with grasslands, savannah, and ponderosa pine forests in the region. Similarly, Hopkins, Cassel, and Bjugstad, (1986) evaluated the breeding bird communities of four woodland types in western North Dakota and found the highest breeding densities in wooded draws; only riparian cottonwood habitats supported a larger number of breeding species.

No longterm studies of avian communities in wooded draws have been conducted. The only project that lasted for at least three years (Hopkins, Cassel, and Bjugstad, 1986) found substantial between-year differences, emphasizing the need for a longer-term perspective to gain understanding of population dynamics in these woodlands. Most of the work to date suffers from either insufficient replication (Hopkins, Cassel, and Bjugstad, 1986) or insufficient duration (Faanes, 1982, 1983, 1987).

Although only two sites in each of four woodland types were surveyed, Hopkins, Cassel, and Bjugstad (1986) found that Cooper's Hawk, Long-eared Owl, and Mountain Bluebird nested only in wooded draws and that many Neotropical migrants (Red-eyed Vireo, Black-and-White Warbler, Yellow-breasted Chat, American Redstart, Lazuli Bunting, Rufous-sided Towhee, Lark Sparrow, and American Goldfinch [also Black-capped Chickadee]) were significantly more abundant in ash woodlands than in juniper, pine, or even cottonwood habitats.

Only Faanes (1987) attempted to analyze wooded draw avifaunas in a landscape context by examining the dispersion pattern of draws relative to one another and by seeking area-

related relationships for measures of avian community characteristics such as diversity and richness. No significant relationships were found between habitat area and either species diversity or richness (although species richness was found to increase with increasing area of ash woodlands in several theses cited by Hopkins, Cassel, and Bjugstad [1986]). Although Faanes (1987) provided no area data, it seems likely that the range of habitat sizes was simply too small to display any area effects across these inherently small woodlands.

The best assessment of livestock grazing impacts on wooded draw avifaunas was conducted over two years in northwestern South Dakota (Hodorff, Sieg, and Linder, 1988). The primary impact of cattle was the creation of open-canopy stands that consisted of a low shrub layer, a sparse overstory provided by decadent trees, an herbaceous layer of invasive, mostly alien species, and the complete absence of intermediate vegetation layers. In contrast, undisturbed stands were structurally complex and characterized by a closed-canopy, varied size and age classes of trees and shrubs, and a significant herbaceous layer of native sedges, grasses, and forbs. Cattle grazing precluded woody plant recruitment by trees and tall shrubs in the open stands—a result that is strikingly similar to the effects of cattle grazing in riparian woodlands. The lack of successful reproduction and replacement by trees and shrubs was leading to conversion of these woodlands into grass-forb communities.

Both breeding season and migration avifaunas were surveyed by Hodorff, Sieg, and Linder (1988). In a comparison between closed-canopy and open-canopy stands, overall numbers of birds were significantly greater in closed-canopy stands. Among Neotropical migrants, Orange-crowned Warbler, Rufous-sided Towhee, and American Goldfinch were significantly more abundant during the breeding season in closed-canopy stands (as were Great Horned Owl, Black-capped Chickadee, and Field Sparrow). Only the Western Meadowlark

was significantly more abundant in open-canopy stands. During migration, *Empidonax* flycatchers, Swainson's Thrush, American Robin, Wilson's Warbler, and Dark-eyed Junco were significantly more abundant in the undisturbed stands (of these four species, only the robin was present during the breeding season).

Similarly in western North Dakota, Faanes (1987) documented a significant correlation between avian species diversity and foliage volume in the "high ground layer," which consisted of taller grasses and forbs, larger woody seedlings, and young shrubs. Faanes (1987) points out that this layer is the first to be impacted by cattle grazing and trampling in wooded draws.

Within the Northern Region, there appears to be significant geographic variation in the species composition of breeding bird communities in prairie thicket habitats. A longterm assessment of Neotropical migrant breeding populations across the full geographic spectrum of these woodlands is urgently needed in view of the potential loss of these habitats to increased levels of agricultural, industrial, and energy development (Hopkins, Cassel, and Bjugstad, 1986). The potentially great importance of these woodlands to migrating birds (Hodorff, Sieg, and Linder, 1988) adds further urgency to this need.

## Shelterbelts

Shelterbelts are woodlands consisting of rows of trees and shrubs that form islands of woody vegetation surrounded by a sea of agricultural fields and native grasslands. Although superficially similar to wooded draws by virtue of their island-like distribution and linear configuration, shelterbelts are planted, not natural habitats. Shelterbelts occur as multi-row plantings or as single-row windbreaks, and are widely distributed across the northern plains.

The extensive creation of shelterbelts across the Great Plains during this century, along with

the spread of riparian woodlands that resulted from managed stream flows, provided dispersal corridors for forest birds. Many of these species were able to traverse the former ecological barrier presented by the grasslands of the Great Plains. The result was a mixing of species that were separated historically and produced an increased "cosmopolitanism" of the region's avifauna (Knopf, 1986).

On a local scale in many parts of the Great Plains, shelterbelts are frequently the only significant woodlands. It is thus not surprising that birds often make considerable use of these habitats. Hopkins, Cassel, and Bjugstad (1986) reported greater total bird densities in shelterbelts of western North Dakota than in other types of woodlands, but lower species richness than found in other deciduous woodlands. Similarly, Faanes (1982) found higher total densities of breeding birds in shelterbelts than in any other habitat surveyed in east-central North Dakota (although Mourning Doves accounted for nearly 30 percent of the total).

Martin (1980) examined 69 shelterbelts over two years in South Dakota and found that total abundance and number of species were highly correlated with shelterbelt area during spring migration and during the breeding season. Several theses and unpublished reports cited by Hopkins, Cassel, and Bjugstad (1986) similarly reported that bird species richness and density increased with shelterbelt area and age during the breeding season in North Dakota. The importance of shelterbelts to breeding populations of declining or less common Neotropical migrant species may be overstated by these general relationships, however. For example, Common Grackle, Mourning Dove, American Robin, and House Sparrow were four of the five most abundant species in the shelterbelts analyzed by Martin (1980).

Shelterbelts are viewed as potential substitutes for the loss of native upland woodlands in the northern plains (Hopkins, Cassel, and Bjugstad, 1986). While it is clear

that birds make significant use of shelterbelts during the breeding season, no studies have examined the relative nesting success of these populations. Shelterbelts are consummate edge-habitats embedded in essentially agricultural landscapes, and as such are likely to provide easy nest access to avian and mammalian nest predators and to the brood-parasitic cowbird. There is a distinct possibility that shelterbelts may function as population sinks (Robinson, 1992) or "ecological traps" (Gates and Gysel, 1978) for breeding Neotropical migrants. Before the adequacy of these habitats as substitutes for wooded draws can be evaluated, there must be detailed studies of avian productivity and demography carried out in shelterbelt habitats (and, for that matter, in wooded draws, as well).

## GRASSLANDS AND SHRUBSTEPPE

Although native prairie grasslands and shrubsteppe support fewer species of birds than do forests, no other habitats in the Northern Region have as great a proportion of their species in decline (Paige, 1990). These widespread declines are linked directly to the tremendous reduction in acreage of these habitats caused by agricultural conversion to croplands and by degradation as a result of livestock overgrazing (Bock et al., in press).

### Grasslands

Three types of native grasslands occur on the Great Plains: shortgrass, mixed-grass, and tallgrass prairie (Axelrod, 1985). Grasslands of the Northern Region consist primarily of mixed-grass prairie, with tallgrass prairie confined to the eastern Dakotas (Sims, 1988). Although total biomass is dominated by grasses and sedges, forbs and dwarf shrubs actually comprise a far greater number of the plant species that occur in these habitats. The total number of plant species found in grasslands increases with increasing length of growing season and total annual precipitation, and where topography is more varied and human-induced disturbance is minimal (Sims, 1988). Only a

few remnants of tallgrass prairie remain uncultivated in the northern plains (Sims, 1988).

The mixed-grass prairie is largely a blend of species found in tallgrass and shortgrass prairies (Sims, 1988). This grassland occupies the western Dakotas, northeastern Wyoming, eastern Montana, and the southern portions of the central Canadian provinces. The mixture of intermediate-, short-, and occasional tallgrass species, a large number of forbs, and scattered low shrubs produces the richest plant diversity of all the grasslands found in the Great Plains (Barbour, Burk, and Pitts, 1980).

The species composition of mixed-grass prairies fluctuates more than that of other prairie habitats in response to extreme variation in total annual precipitation, fire suppression, assorted regimens of livestock grazing, and the generally greater topographic heterogeneity of areas occupied by mixed-grass prairie (Sims, 1988). With increasing drought and livestock grazing practices that further intensify aridity, the dominant plant species shift toward the more drought-tolerant species of shorter stature that are typical of shortgrass prairie. With increasing moisture and reduced grazing, plant composition shifts toward species more typical of tallgrass prairie. Although the dynamics of species fluctuations in the mixed-grass prairie are functions of climate, the magnitude of these changes is largely governed by grazing intensity (Sims, 1988).

Fire is an inherent and requisite component of natural cycles in these grasslands (Axelrod, 1985). Prior to the advent of modern agriculture and active fire suppression on the plains, fire frequency was greatest in tallgrass prairie (estimated at every 3-10 years), with longer intervals between fires in mixed-grass prairie and even longer intervals in shortgrass prairie (Daubenmire, 1968; Higgins, Kruse, and Piehl, 1986).

Drought, fire, and ungulate grazing have always been the primary ecological and evolutionary forces shaping the dynamics of



prairie grasslands (Anderson, 1982). These forces combined in the past to create a large-scale mosaic of disturbance-generated habitats across the Great Plains. The size of habitat "patches" created by these disturbances (especially by fire) was likely to have been vastly greater than the size of modern disturbance patches because of the high degree of fragmentation that characterizes today's plains landscape. Given the highly fragmented nature of much of the remnant native prairie, it is surprising that so little attention has been paid to the biological implications of grassland fragmentation. Only two studies explicitly examine this question for prairie-nesting birds, one focused on songbirds (Johnson and Temple, 1986, 1990) and the other on waterfowl (Nelson and Duebbert, 1974).

Johnson and Temple (1986, 1990) found that rates of cowbird parasitism and nest predation were higher on nests of Clay-colored, Savannah, and Grasshopper Sparrows, Bobolink, and Western Meadowlark in small (16-32 ha) versus large (130-486 ha) fragments of undisturbed tallgrass prairie in Minnesota. Nest predation rates were lower for nests on large fragments, in areas more than 45 m from a wooded edge, and in vegetation that had been burned within the past three years. Rates of brood parasitism were lower on nests that were far from wooded edges. For all five species, the areas with the highest nest densities were not the areas with the highest nest productivity—a clear example of the potential for being misled by simply using breeding territory density as a measure of habitat quality or suitability for nesting populations of Neotropical migrants. Johnson and Temple suggest that management of tallgrass prairie to maximize nest productivity should provide large, regularly burned (at least every three years) prairies that are devoid of wooded edges such as shelterbelts or clumps of invading trees.

In an earlier study, Nelson and Duebbert (1974) similarly found higher nesting success for waterfowl on large (32-48 ha) blocks of upland vegetation compared to blocks of 16 or

fewer ha, due to higher rates of nest predation in the smaller fragments. They too concluded that management of larger rather than smaller fragments of prairie habitat will provide for greater avian productivity.

## Effects of Livestock Grazing

In the northern plains, the relative impact of grazing must be viewed in the context of the coevolution of these ecosystems with the grazing pressures exerted by vast herds of nomadic bison, elk, and pronghorn antelope. The evolutionary history of grazing on the northern plains provides considerable insight toward understanding the relative ability of these ecosystems to support grazing by livestock (Mack and Thompson, 1982). The combination of grazing history and drought tolerance is a useful predictor of the grassland community's response to grazing pressures (Milchunas, Sala, and Lauenroth, 1988).

Grazing by domestic livestock differs fundamentally from grazing by bison or other native ungulates because herds of livestock remain in a restricted area rather than shifting across vast landscapes. Domestic livestock exert prolonged and intense grazing pressure that varies with the number of animals per unit area and with the season and duration of their presence. One effect of livestock on northern plains ecosystems has been to greatly reduce fire frequency and intensity by consuming the fine fuels needed to transport fire. The result has been increased invasion by woody plants and the general replacement of intermediate- and tallgrass species by more grazing-tolerant species of shorter stature. In tallgrass prairie, where fires play a critical role in excluding woody vegetation (Gibson and Hulbert, 1987), livestock grazing has converted many areas into woodlands or shrublands. In mixed-grass prairie, fire suppression and cattle grazing result in increased abundance and size of two common shrubs, wolf- or snowberry (*Symphoricarpos occidentalis*) and silverberry (*Elaeagnus commutata*) (Arnold and Higgins, 1986).



The responses of grassland-nesting birds to the effects of livestock grazing in plains grasslands are reviewed in detail by Bock et al. (in press). Although several studies have attempted to compare breeding bird communities among different grazing regimens, virtually all comparisons are across qualitative assessments of grazing intensities (i.e., heavy, moderate, and light). Moreover, there are no longterm studies for any grassland-nesting species and no studies designed explicitly to compare population productivity among undisturbed, grazed, burned, and hayed grasslands. It is therefore impossible to evaluate results meaningfully across studies. In spite of this significant limitation, some consistencies do emerge for several species in the Northern Region. The conclusions reached by Bock et al. (in press) do not differ markedly from those presented by Kirsch, Duebbert, and Kruse (1978) in their earlier review: livestock grazing (and mowing of hay crops) adversely impact most (but not all) species of upland-nesting birds.

Perhaps the most important generalization that can be made about the responses of nesting Neotropical migrants to livestock grazing in the region's grasslands is that no single generalization can be made for these species as a group. All grassland types support some species that are grazing-tolerant or even grazing-dependent, as well as some species that are moderately to extremely grazing-intolerant—which is consistent with the mosaic-like distribution of disturbance patches that these grasslands presented to their evolving avifauna. Some species vary in their responses depending on the type of grassland involved (short-, mixed-, or tall-; e.g., see Kantrud, 1981) and depending on the intensity and season of grazing. Other species do not conform to this pattern and instead respond rather uniformly. For example, Horned Larks are invariably favored by the creation of open areas through grazing. At the opposite end of the response spectrum, Northern Harrier and Short-eared Owl nest in dense vegetation found only in ungrazed areas (Duebbert and Lokemoen, 1977). The latter two

species frequently nest in association with stands of shrubs (especially snowberry) in undisturbed native grasslands (Kantrud and Higgins, 1992).

Most upland shorebirds generally prefer relatively short and sparse grasslands (Kantrud and Higgins, 1992), ranging from minimal vegetation for Mountain Plover to well-vegetated sites for Upland Sandpiper. Among these shorebirds, we have meaningful data on nest success (rather than simply on nest occurrence) only for Upland Sandpipers, which experience significantly greater nesting success in undisturbed and in burned mixed-grass prairie compared to grazed habitats (Kirsch and Higgins, 1976; Kantrud and Higgins, 1992). Both Marbled Godwit and Willet appear to nest preferentially in native prairie rather than in grasslands seeded with exotic species (Kantrud and Higgins, 1992). The presence of livestock appears to deter nesting by most shorebirds (Kantrud and Higgins, 1992).

Songbirds similarly exhibit an array of species-specific responses: Savannah Sparrow, Baird's Sparrow and Bobolink (as well as the declining, non-Neotropical, Sharp-tailed and Le Conte's Sparrows) almost invariably respond negatively to any level of livestock grazing in mixed-grass prairie (e.g., Maher, 1979). Disturbance either by mowing or cattle grazing is known to reduce or eliminate populations of Sprague's Pipit and Baird's Sparrow in southern Alberta (Owens and Myres, 1973). At the other extreme, Horned Lark, Lark Sparrow, and McCown's Longspur generally respond positively to moderate and sometimes to heavy grazing pressure (e.g., Owens and Myres, 1973; Maher, 1979).

Another group of species responds positively or negatively to livestock grazing depending on the type and condition of grassland. Species that appear to favor intermediate stature and cover respond positively to grazing in tallgrass prairie and more robust mixed-grass prairie, but respond negatively in sparser mixed-grass habitats (e.g.,

Sprague's Pipit, Grasshopper Sparrow, and Chestnut-collared Longspur) (Bock et al., in press) and in shortgrass prairie (Ryder, 1980).

## Impacts of Pest Management

Since 1977, the USDA Animal Plant Health Inspection Service (APHIS) has conducted an extensive grasshopper control program across many portions of the western United States on public and private range- and croplands. This program includes extensive aerial application of broad spectrum insecticides across tens of thousands to hundreds of thousands of hectares annually in the Northern Region. These control programs indiscriminately reduce populations of a wide range of insects and other invertebrate species. The effects (both direct and indirect) on grassland birds are far from clear, and several studies are now in progress to evaluate some of the potential problems for selected species (McEwen, George, and Petersen, 1990). The wholesale reduction of prey populations for insectivorous grassland-nesting birds across large areas should be of great concern to land managers.

## Summary and Recommendations

The continued loss of habitat poses the greatest threat to breeding populations of Neotropical migrants in native prairie grasslands. Relatively little undisturbed mixed-grass prairie and very little native tallgrass prairie of any sort remain. As recommended by Bock et al. (in press), there is an urgent need to dramatically increase the amount of public rangeland from which all livestock are permanently excluded. There is no shortage of grazed and hayed lands for those species that benefit from these activities. By comparison, habitat for species with breeding requirements that are not compatible with grazing and haying is exceedingly rare and continues to diminish.

In the northern plains, the native prairie on the National Grasslands offers the most viable opportunity for preservation of breeding populations of grazing-intolerant Neotropical

migrants. These areas could be managed by a return to natural ecosystem functioning through the use of prescribed burning in conjunction with minimal livestock grazing. In contrast to most current practices, livestock use of allotments would require separation by long (25-50 year) rotations to allow reasonable recovery of these areas (Bock et al., in press).

Chronic livestock grazing on shortgrass and mixed-grass prairie alters the structure and composition of plant communities in ways that greatly enhance conditions for population outbreaks of grasshoppers (see e.g., Quinn and Walgenbach, 1990, and references therein). Benefits of the proposed management scenario for land managers concerned with maintaining or enhancing populations of Neotropical migrants in native grasslands include the elimination of pesticide applications under the APHIS program. As rangeland conditions improve, these grasslands will become increasingly unlikely to support grasshopper outbreaks, and will provide conditions that should allow predation by grassland birds (and other natural enemies) to effectively maintain grasshopper populations at low or moderate densities (Fowler et al., 1991).

An additional avenue for maintaining and restoring grassland-nesting Neotropical migrants is offered by the federally-sponsored Conservation Reserve Program (CRP). The CRP was designed to encourage landowners to convert formerly tilled cropland into grassland. Millions of hectares of CRP grasslands have been planted on the Great Plains since 1985, although most of these lands are planted with exotic grasses (Joyce et al., 1991). Even so, CRP grasslands are of far greater use to native wildlife than the croplands that they replace (Kantrud and Higgins, 1992). By modifying the current program to require plantings exclusively of native vegetation and encouraging their longterm maintenance, the amount of suitable breeding habitat for populations of grassland-inhabiting Neotropical migrants (and many other wildlife species, as well) could be increased dramatically.



## Shrubsteppe

Sagebrush-dominated (*Artemisia* sp.) shrubsteppe is distributed over much of the Intermountain West—the area bounded by the mountains of the Sierra and Cascades on the west and the Rocky Mountains on the east. Although the avifauna of shrubsteppe is one of the most species-poor in the United States, it is relatively distinctive (Wiens, 1989a). Three species of Neotropical migrants (Sage Thrasher, Sage Sparrow, and Brewer's Sparrow) are almost exclusively associated with sagebrush-shrubsteppe, and two others (Green-tailed Towhee and Vesper Sparrow) are largely associated with this habitat (Baker et al., 1976).

Unlike native prairie grasslands, shrubsteppe plant communities did not coevolve with nomadic herds of bison or other large ungulates (Mack and Thompson, 1982). The introduction of cattle and sheep to areas of shrubsteppe profoundly altered the vegetation of these habitats and resulted in a virtually complete loss of the perennial grasses that grew among the scattered shrubs. These landscapes have been converted by livestock grazing (and fire suppression) into relatively much denser shrub communities, with the interstitial native bunchgrasses replaced by bare ground and exotic grasses and forbs.

The combination of intense livestock grazing and active fire suppression facilitates the spread of shrubs into grasslands and increases the density of shrub coverage. As a result, shrubsteppe habitat in the Northern Region, if defined by its structure rather than by shrub species composition, now occurs from portions of the western plains in the Dakotas through much of eastern and central Montana and across northern Wyoming.

Extensive studies by Wiens, Rotenberry, and their colleagues document the dynamic nature of shrubsteppe avifaunas (Wiens and Rotenberry, 1981; Wiens, Rotenberry, and Van Home, 1986; Wiens, 1989a) and demonstrate the high degree of unpredictability in the

fluctuations of shrubsteppe bird populations. Against this template of inherent change, it is unfortunate that no longterm, well-replicated studies have been conducted to compare avifaunas in grazed and ungrazed shrubsteppe communities. The extreme scarcity of ungrazed shrubsteppe that is not dominated by exotic vegetation makes it highly unlikely that we will ever be able to assess the historic effects of livestock grazing on these avifaunas. Based on the changes that grazing produces in shrubsteppe vegetation and given the nesting requirements for many of the birds associated with these habitats, Bock et al. (in press) attempted to provide a reasoned set of predictions for responses by some shrubsteppe-typical species to grazing. Nearly all of the relevant studies that have been conducted occurred outside of the Northern Region.

Responses by some species will vary as the grazing-altered plant community changes through time. For example, Burrowing Owl and Horned Lark initially will respond positively to decreased herbaceous cover and increased bare ground produced by livestock grazing, but eventually will respond negatively to the increasing shrub coverage that grazing brings about. Increased bare ground for foraging and increased shrub coverage for nesting and perching should positively favor both Sage Sparrow and Brown-headed Cowbird. Aside from studies of nesting Sage Thrashers (Rich and Rothstein, 1985), little is known about the interactions of cattle, cowbirds, and nest parasitism in shrubsteppe habitats.

There is virtually no information concerning the responses of raptors to grazing in shrubsteppe. Bock et al. (in press) suggest that Golden Eagles may respond positively to grazing by virtue of the association between their primary prey (jackrabbits) and shrubby habitats. Similarly, the need for dense ground cover for nest sites and the association between rodent prey and herbaceous ground cover likely produce negative responses to grazing by Northern Harrier, Ferruginous Hawk, and Short-eared Owl. The requirement of grass and forb

cover for nesting and foraging likely translates into negative responses to grazing for Long-billed Curlew, Vesper, Savannah, and Grasshopper Sparrows, and Western Meadowlark.

As indicated by Bock et al. (in press), the great majority of shrubsteppe-nesting bird species are likely to be impacted negatively by livestock grazing. The extreme modification of vegetation structure and species composition in shrubsteppe as a result of livestock grazing creates communities that are depauperate both in plant and avian species.

Considerable effort has been expended to "control" sagebrush in order to provide increased forage for cattle in overgrazed shrubsteppe where most of the native grass component has been lost. Herbicidal treatment, mechanical alteration (plowing, chaining, and disking), and burning of extensive, decadent stands have all been used toward this end.

The effect of herbicidal spraying on shrubsteppe avifaunas appears to depend upon the relative proportion of sagebrush that is killed and the extent to which the dead shrubs remain standing. In Montana shrubsteppe, herbicidal spraying that killed 50 percent or less of the sagebrush produced no differences in nesting densities of either Brewer's or Vesper Sparrows (Best, 1972), which together comprised between 75 and 90 percent of the breeding birds (Feist, 1968). In plots in Montana and Wyoming where 100 percent of the sagebrush was killed, the shrub-nesting Brewer's Sparrow declined by more than 50 percent in the first year following spraying (Best, 1972; Schroeder and Sturges, 1975), while the ground-nesting Vesper Sparrow was unaffected. Subsequent studies in Montana found that Brewer's Sparrows had disappeared almost completely by the fifth year following spraying (described by Baker et al., 1976).

Although fire apparently occurred less frequently in shrubsteppe habitats than in plains grasslands, it nevertheless was an integral part of

the normal functioning of shrubsteppe ecosystems. Prior to the appearance of domestic livestock, fire presumably created a landscape-scale mosaic of habitats ranging from relatively bunchgrass-dominated communities in recently burned patches to relatively shrub-dominated communities in areas that had not burned for several decades.

In today's much altered landscape, the inability of sagebrush to resprout after being burned has led to the replacement of shrubsteppe in many places by European annual grass communities in the wake of repeated fires (West, 1988). Complete removal of the standing shrub community by fire or by other means, followed by complete replacement with grasses, results in a species-poor, sparsely-nesting "community" of breeding birds comprised almost entirely of Horned Larks or Western Meadowlarks (Reynolds and Trost, 1981; Bock and Bock, 1987; T. D. Rich, pers. comm.). In contrast, where fire produces a spatially heterogeneous mosaic of burned and unburned patches, the breeding avifauna appears to be little affected (Petersen and Best, 1987). Land managers seeking to return dense, decadent stands of shrubsteppe to more natural conditions should strive to produce landscape-scale mosaics of burned and unburned patches if this can be achieved without risking wholesale invasion of cheatgrass (*Bromus tectorum*) and other exotic herbaceous species.

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## HABITAT PROFILES

The following habitat profiles are schematic representations intended to illustrate the impacts of selected management activities on Neotropical migrant landbirds in the northern Rockies and Great Plains. The presence and absence of species depicted in the profiles illustrate the changes in avian community composition that occur under different management actions, and is based on research described in the preceding section covering management activities and impacts. Names of species appear in the drawings to illustrate nesting and/or foraging locations used by the birds in these habitats. Species designated in parentheses are not Neotropical migrants but are key species that are significantly associated with the habitat.

Figure 4. Old-growth coniferous forest characterized by abundant live trees of varied age-classes, a relatively closed canopy, many standing snags of very large diameter, large diameter downed and dead woody debris, and a scattered but dense growth of herbaceous plants and shrub thickets. The indicated species represent a composite of significant associates of old-growth Douglas-fir and ponderosa pine forests in the region.

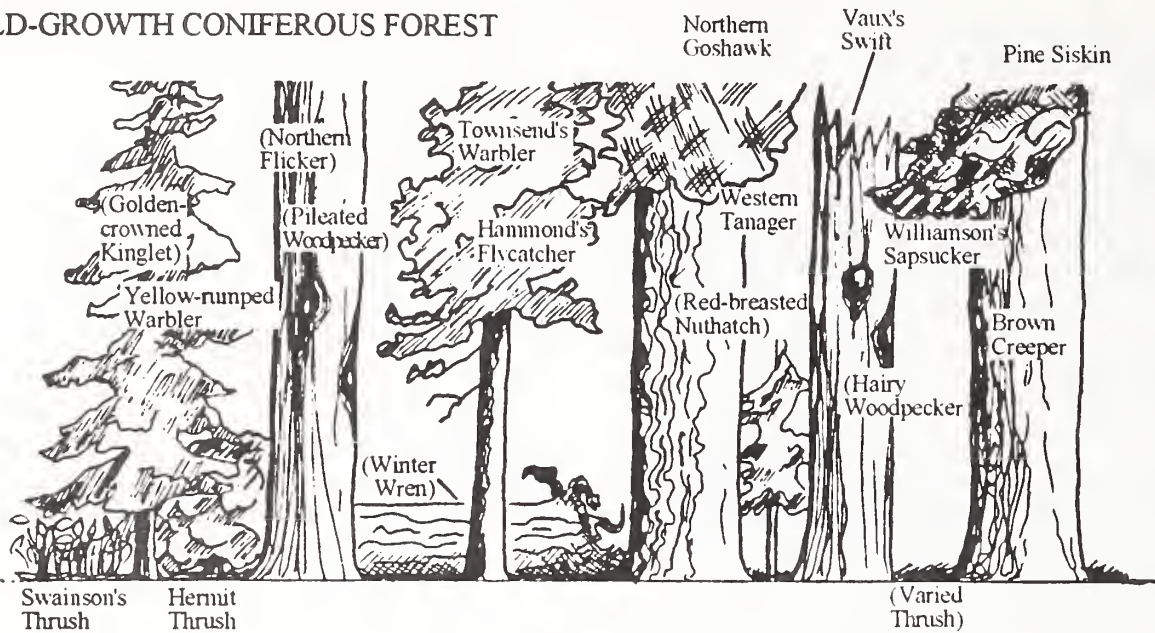
Thinned, rotation-age coniferous forest characterized by even-age trees spaced more widely than in the old growth, a relatively open canopy, sparse scattered grasses, forbs, and shrubs, and the complete absence of large diameter downed and dead woody debris. Standing snags are rare and large standing snags are entirely absent because large live trees were not retained at harvest, thus precluding snag recruitment as the stand aged. The structural simplification of stands managed in this way results in the absence of nearly all birds normally associated with old growth.

Clear-cut coniferous forest managed to maximize structural diversity by retention of several large live trees to provide nesting and foraging substrates and for snag recruitment in the future, retention of standing snags of varied sizes, retention of all deciduous trees and shrub thickets, and retention of slash piles to provide nesting and foraging habitat. Retaining these features more closely simulates the conditions following a natural disturbance (such as fire) and facilitates the pace of successional recovery.

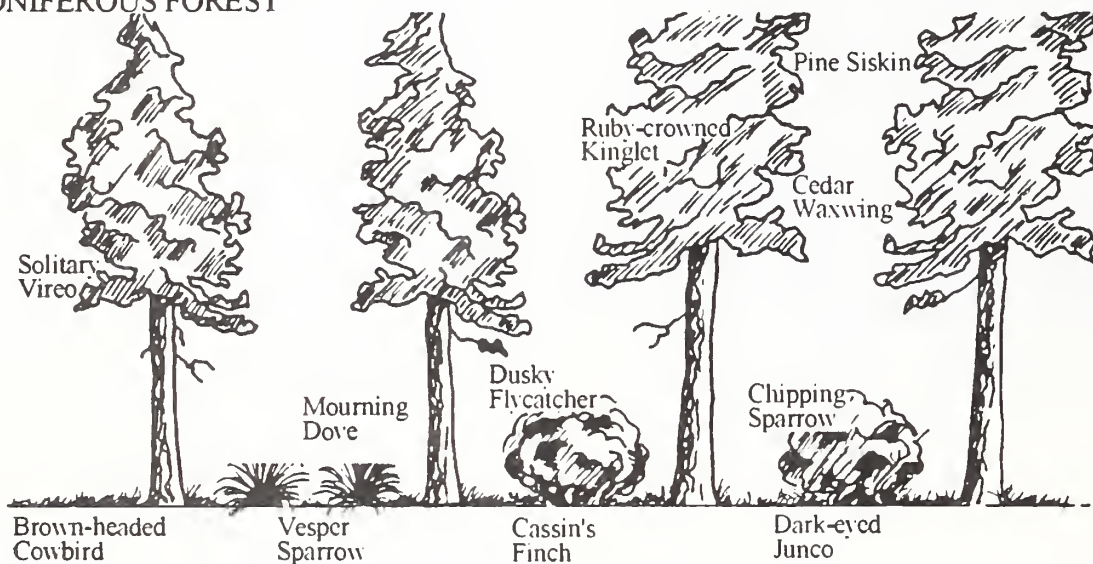


Figure 4.

## OLD-GROWTH CONIFEROUS FOREST



## THINNED, ROTATION AGE CONIFEROUS FOREST



## EARLY SUCCESSION CLEAR-CUT CONIFEROUS FOREST

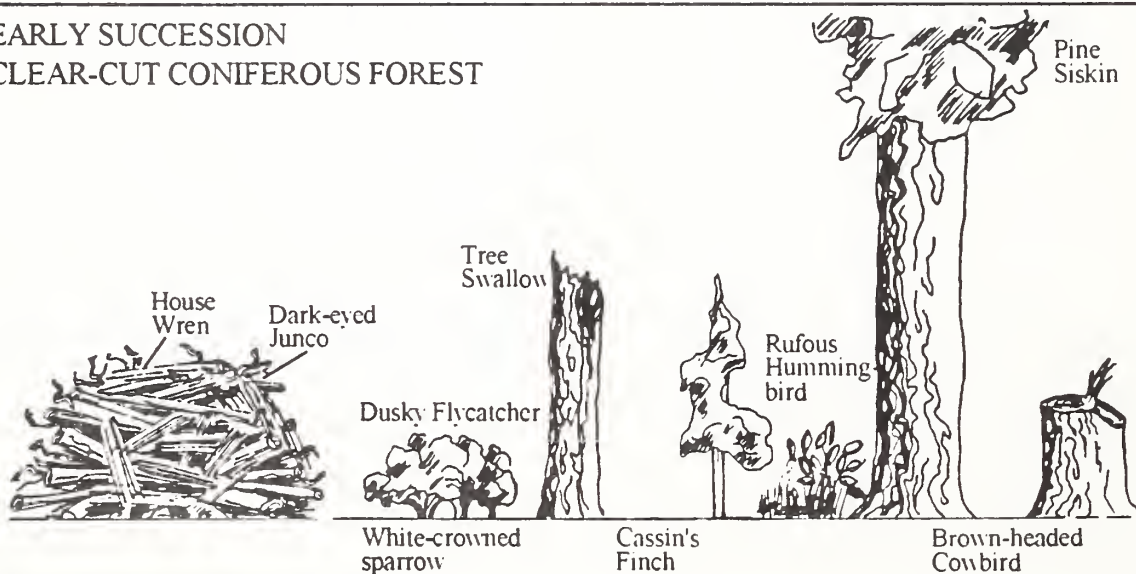
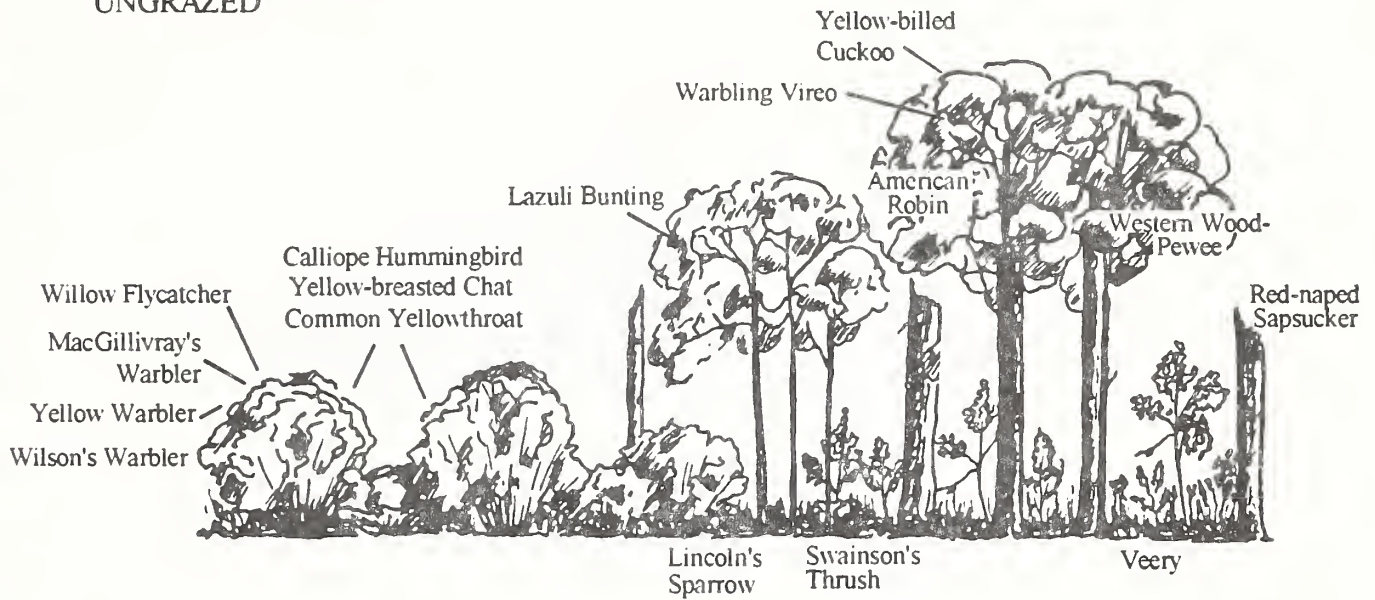


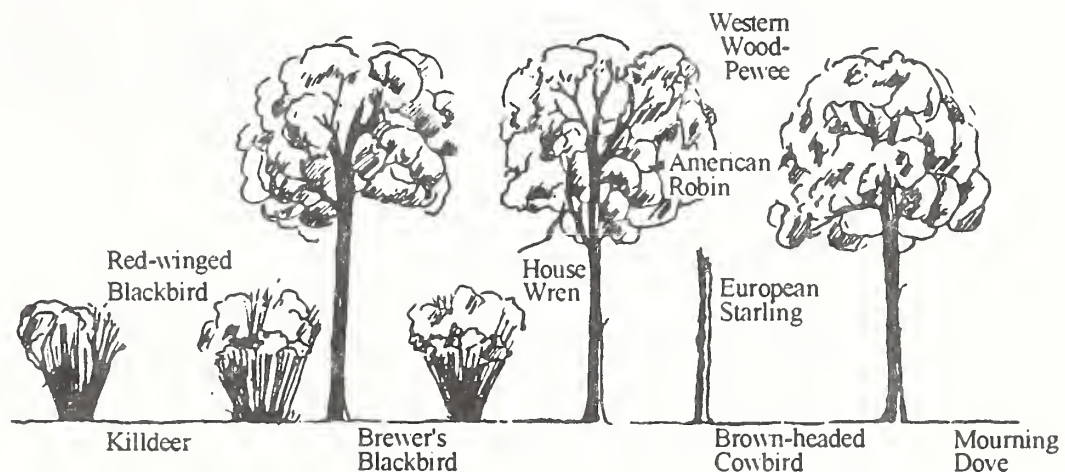
Figure 5.

## RIPARIAN WOODLAND UNGRAZED



Riparian woodland without livestock grazing, characterized by robust trees and shrubs (from left to right, willow, aspen, and cottonwood) of varied sizes and age classes, abundant standing snags, and a dense herbaceous layer of forbs, sedges, and grasses. Tree overstories are relatively dense, and shrub thickets are dense and continuous. Recruitment of young trees and shrubs is evident.

## RIPARIAN WOODLAND HEAVILY GRAZED



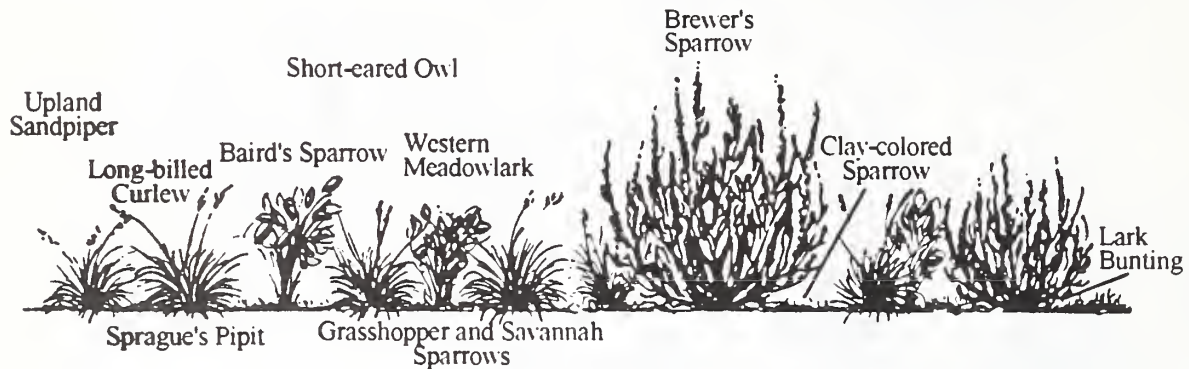
Heavily grazed riparian woodland, characterized by a sparse, decadent overstory of trees, scattered clumps of decadent, pedestaled shrubs, the replacement of most of the herbaceous layer by bare ground, and the complete absence of recruitment by woody species. Snags do not remain standing for long and are relatively scarce. Bird species composition in this habitat differs dramatically from the avifauna in the ungrazed, healthy riparian woodland. Most of the birds in the heavily grazed riparian are generalist species that occur widely in human-disturbed landscapes.



Figure 6.

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MIXED-GRASS PRAIRIE/SHRUBSTEPPE  
UNGRAZED  
PRAIRIE BURNED AT 5-10 YEAR INTERVALS



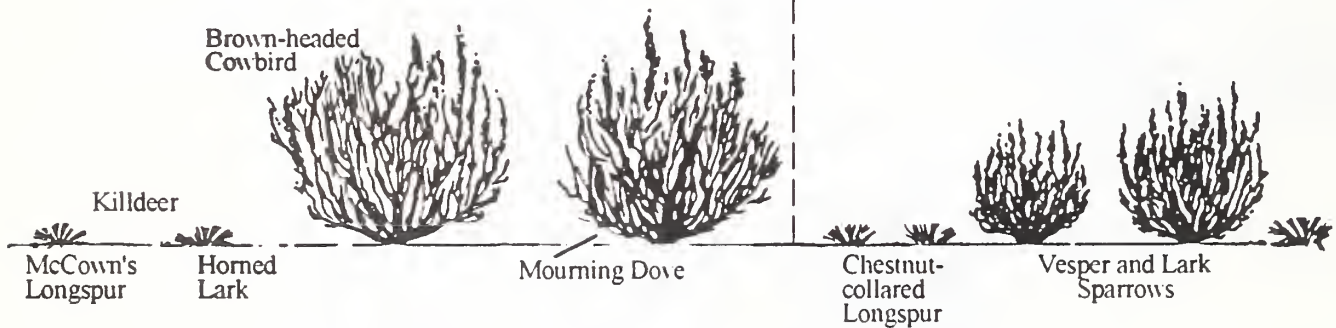
Ungrazed, regularly burned mixed-grass prairie, characterized by robust native bunchgrasses and forbs with relatively little bare ground; ungrazed shrubsteppe, characterized by shrubs of varying heights and native bunchgrasses growing between shrubs.

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MIXED-GRASS PRAIRIE/SHRUBSTEPPE

HEAVILY GRAZED

MODERATELY GRAZED



Moderately grazed mixed-grass prairie, characterized by bunchgrasses of shorter stature and relatively more bare ground than occurs in ungrazed prairie; moderately grazed shrubsteppe, characterized by shrubs of more uniform size and greater density, and by loss of most interstitial bunchgrasses. As conditions change under moderate grazing, most bird species that are typical of ungrazed habitat are lost and a few new species are added.

Heavily grazed mixed-grass prairie, characterized by widely-spaced bunchgrasses of short stature and much bare ground; heavily grazed shrubsteppe, characterized by decadent stands of shrubs that are uniform in size and are separated by areas of bare ground due to loss of all interstitial bunchgrasses. As conditions change from moderate to heavy grazing, bird species that are typical of ungrazed and moderately grazed conditions are lost and replaced mostly by generalist species that thrive in highly disturbed habitats.







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## EXPLANATION OF SPECIES ACCOUNTS

The following section contains individual accounts for the 144 species of Neotropical migrant landbirds that breed in the Northern Region. The information contained in each account is drawn from a wide range of source materials and was critically assessed for applicability to populations occurring in the region. The information is not intended to be all-encompassing for species that have breeding populations outside of the region as well. For many birds, specific information pertaining to populations in the northern Rockies and Great Plains simply is not available and I have tried to winnow through more general information to select only what may be applicable for the region's populations. I refer the reader to *The Birder's Handbook: A Field Guide to the Natural History of North American Birds* (Ehrlich, Dobkin, and Wheye, 1988) for broader perspectives and additional details of North American species.

These accounts are meant to give the reader a brief synopsis of the most pertinent information relevant to the conservation and management needs of each species. They are road maps of our knowledge about populations of Neotropical migrants in the Northern Region. These accounts bear an implicit invitation to gather the data needed to fill the all-too-obvious gaps in our "maps."

Preceding the species accounts are two tables that list all the species and their familial/subfamilial relationships, and indicate where each species winters. Table 1 lists the species in standard taxonomic order, grouped by family or subfamily, and provides a numeric code for wintering area, as follows:

1. Winters exclusively in South America
2. Winters exclusively in Mexico
3. Winters from Mexico southward
4. Winters from U.S. southward
5. Winters entirely within U.S. and Mexico

6. Some populations are Resident in the U.S. and some winter south of the U.S.

Likewise, Table 2 lists the species phylogenetically but is organized by wintering area.

Each species account consists of the following sections:

1. Seasonal residency status for populations within the region.
2. Wintering area code (from Tables 1 and 2).
3. The range of habitats utilized by nesting populations within the region, including specific nest location. Relative importance of different habitats to breeding populations is given where such information is available.
4. Principal food habits and foraging techniques.
5. Status and management, including analysis of regional, western, and continent-wide population trends based on the USFWS Breeding Bird Survey database; information on sources of population problems; conservation status; ecological or behavioral peculiarities that may affect management; specific management impacts (both negative and positive), including potential for population enhancement; frequency of cowbird parasitism. Citations pertaining to management activities for the species are included within this paragraph.
6. Further reading relating to ecological and behavioral information for the species. Only the most recent citations are given to provide the user with entry to the literature without producing an overwhelmingly large bibliography. The reader can then use the bibliographies of the cited references to work back into the older literature. Citations provided in the Status and Management paragraph are not repeated here.

7. At the bottom of each account is a detailed range map compiled from the most recent state-wide atlases and distributional studies for the states covered. The maps illustrate the breeding season distribution of each species within the region. Where information could not be located or appeared contradictory, I inserted question marks to highlight the need for more accurate data. Although these maps are the most detailed to date for the region as a whole, they are still fairly coarse and certainly subject to revision with the acquisition of more extensive and more recent information.

Idaho distributions are based on recently compiled latilong maps (Stephens and Sturts, 1991). Montana distributions were mapped on a finer scale, by occurrences in quarter divisions within each latilong; the Montana Natural Heritage Program kindly provided quarter-latilong maps from a prepublication manuscript (Bergeron et al., 1992). North Dakota distributions are based on Stewart (1975), and supplemented where possible with recent publications dealing with specific areas of the state. South Dakota maps are based partly on Johnsgard (1979) and partly on the revised western range maps of Peterson (1990) and of the National Geographic Society (1990). Maps in these two field guides were used in conjunction with a wide array of literature to fill in ranges for the remainder of the region. In all cases, I attempted to evaluate the details of each species' distribution and conservatively excluded most "outlier" occurrences and records of isolated sightings that were not of recent origin.

Table 1. Neotropical Migrants in Taxonomic Order Including Wintering Area

Family/ Subfamily	Species	Wintering Area	Family/ Subfamily	Species	Wintering Area
Cathartidae	Turkey Vulture	4	Trochilidae	Rufous Hummingbird	2
Accipitridae	Osprey	4	Alcedinidae	Belted Kingfisher	4
Accipitridae	Northern Harrier	4	Picidae	Lewis' Woodpecker	5
Accipitridae	Sharp-shinned Hawk	4	Picidae	Yellow-bellied Sapsucker	4
Accipitridae	Cooper's Hawk	4	Picidae	Red-naped Sapsucker	4
Accipitridae	Northern Goshawk	5	Picidae	Williamson's Sapsucker	5
Accipitridae	Broad-winged Hawk	3	Tyrannidae	Olive-sided Flycatcher	1
Accipitridae	Swainson's Hawk	1	Tyrannidae	Western Wood-Pewee	1
Accipitridae	Red-tailed Hawk	4	Tyrannidae	Eastern Wood-Pewee	1
Accipitridae	Ferruginous Hawk	5	Tyrannidae	Least Flycatcher	3
Accipitridae	Golden Eagle	6	Tyrannidae	Hammond's Flycatcher	4
Falconidae	American Kestrel	4	Tyrannidae	Dusky Flycatcher	5
Falconidae	Merlin	4	Tyrannidae	Willow Flycatcher	3
Falconidae	Peregrine Falcon	4	Tyrannidae	Cordilleran Flycatcher	2
Falconidae	Prairie Falcon	5	Tyrannidae	Eastern Phoebe	5
Charadriidae	Mountain Plover	5	Tyrannidae	Say's Phoebe	5
Charadriidae	Killdeer	4	Tyrannidae	Great Crested Flycatcher	3
Scolopacidae	Willet	4	Tyrannidae	Cassin's Kingbird	3
Scolopacidae	Spotted Sandpiper	4	Tyrannidae	Western Kingbird	3
Scolopacidae	Upland Sandpiper	1	Tyrannidae	Eastern Kingbird	1
Scolopacidae	Long-billed Curlew	5	Alaudidae	Horned Lark	6
Scolopacidae	Marbled Godwit	4	Hirundinidae	Purple Martin	1
Columbidae	Mourning Dove	4	Hirundinidae	Tree Swallow	4
Cuculidae	Yellow-billed Cuckoo	1	Hirundinidae	Violet-green Swallow	4
Cuculidae	Black-billed Cuckoo	1	Hirundinidae	Northern Rough-winged Swallow	4
Strigidae	Flammulated Owl	3	Hirundinidae	Bank Swallow	1
Strigidae	Burrowing Owl	4	Hirundinidae	Cliff Swallow	1
Strigidae	Long-eared Owl	5	Hirundinidae	Barn Swallow	1
Strigidae	Short-eared Owl	5	Certhiidae	Brown Creeper	6
Caprimulgidae	Common Nighthawk	1	Troglodytidae	Rock Wren	5
Caprimulgidae	Common Poorwill	5	Troglodytidae	House Wren	5
Apodidae	Chimney Swift	1	Troglodytidae	Sedge Wren	5
Apodidae	Vaux's Swift	3	Troglodytidae	Marsh Wren	5
Apodidae	Black Swift	3	Sylviinae	Ruby-crowned Kinglet	4
Apodidae	White-throated Swift	4	Muscicapinae	Eastern Bluebird	6
Trochilidae	Ruby-throated Hummingbird	4	Muscicapinae	Western Bluebird	6
Trochilidae	Black-chinned Hummingbird	2	Muscicapinae	Mountain Bluebird	5
Trochilidae	Calliope Hummingbird	2	Muscicapinae	Townsend's Solitaire	5
Trochilidae	Broad-tailed Hummingbird	3			



Table 1. (continued)

Family/ Subfamily	Species	Wintering Area	Family/ Subfamily	Species	Wintering Area
Muscicapinae	Veery	1	Emberizinae	Chipping Sparrow	5
Muscicapinae	Swainson's Thrush	3	Emberizinae	Clay-colored Sparrow	5
Muscicapinae	Hermit Thrush	4	Emberizinae	Brewer's Sparrow	5
Muscicapinae	American Robin	6	Emberizinae	Vesper Sparrow	5
Mimidae	Gray Catbird	4	Emberizinae	Lark Sparrow	5
Mimidae	Northern Mockingbird	6	Emberizinae	Sage Sparrow	5
Mimidae	Sage Thrasher	5	Emberizinae	Savannah Sparrow	4
Motacillidae	Water Pipit	4	Emberizinae	Lark Bunting	5
Motacillidae	Sprague's Pipit	5	Emberizinae	Baird's Sparrow	5
Bombycillidae	Cedar Waxwing	4	Emberizinae	Grasshopper Sparrow	4
Laniidae	Loggerhead Shrike	5	Emberizinae	Fox Sparrow	5
Vireonidae	Bell's Vireo	3	Emberizinae	Song Sparrow	6
Vireonidae	Solitary Vireo	4	Emberizinae	Lincoln's Sparrow	4
Vireonidae	Yellow-throated Vireo	4	Emberizinae	Swamp Sparrow	5
Vireonidae	Red-eyed Vireo	1	Emberizinae	White-crowned Sparrow	5
Vireonidae	Warbling Vireo	3	Emberizinae	Dark-eyed Junco	6
Parulinae	Tennessee Warbler	3	Emberizinae	McCown's Longspur	5
Parulinae	Orange-crowned Warbler	4	Emberizinae	Chestnut-collared Longspur	5
Parulinae	Nashville Warbler	4	Icterinae	Bobolink	1
Parulinae	Yellow Warbler	4	Icterinae	Red-winged Blackbird	6
Parulinae	Yellow-rumped Warbler	4	Icterinae	Western Meadowlark	6
Parulinae	Townsend's Warbler	4	Icterinae	Yellow-headed Blackbird	5
Parulinae	Black-and-white Warbler	4	Icterinae	Brewer's Blackbird	6
Parulinae	American Redstart	3	Icterinae	Orchard Oriole	3
Parulinae	Ovenbird	4	Icterinae	Northern Oriole	3
Parulinae	Northern Waterthrush	4	Fringillidae	Cassin's Finch	5
Parulinae	MacGillivray's Warbler	3	Fringillidae	Pine Siskin	6
Parulinae	Common Yellowthroat	4	Fringillidae	American Goldfinch	5
Parulinae	Wilson's Warbler	4			
Parulinae	Yellow-breasted Chat	4			
Thraupinae	Scarlet Tanager	1			
Thraupinae	Western Tanager	3			
Cardinalinae	Lazuli Bunting	5			
Cardinalinae	Indigo Bunting	3			
Cardinalinae	Dickcissel	3			
Cardinalinae	Rose-breasted Grosbeak	3			
Cardinalinae	Black-headed Grosbeak	5			
Emberizinae	Green-tailed Towhee	5			
Emberizinae	Rufous-sided Towhee	6			

Table 2. Neotropical Migrants in Taxonomic Order Organized by Wintering Area

Family/ Subfamily	Species	Wintering Area	Family/ Subfamily	Species	Wintering Area
WINTERS IN SOUTH AMERICA			Vireonidae	Warbling Vireo	3
Accipitridae	Swainson's Hawk	1	Parulinae	Tennessee Warbler	3
Scolopacidae	Upland Sandpiper	1	Parulinae	American Redstart	3
Cuculidae	Yellow-billed Cuckoo	1	Parulinae	MacGillivray's Warbler	3
Cuculidae	Black-billed Cuckoo	1	Thraupinae	Western Tanager	3
Caprimulgidae	Common Nighthawk	1	Cardinalinae	Indigo Bunting	3
Apodidae	Chimney Swift	1	Cardinalinae	Dickcissel	3
Tyrannidae	Olive-sided Flycatcher	1	Cardinalinae	Rose-breasted Grosbeak	3
Tyrannidae	Western Wood-Pewee	1	Icterinae	Orchard Oriole	3
Tyrannidae	Eastern Wood-Pewee	1	Icterinae	Northern Oriole	3
Tyrannidae	Eastern Kingbird	1	WINTERS FROM U.S. SOUTHWARD		
Hirundinidae	Purple Martin	1	Cathartidae	Turkey Vulture	4
Hirundinidae	Bank Swallow	1	Accipitridae	Osprey	4
Hirundinidae	Cliff Swallow	1	Accipitridae	Northern Harrier	4
Hirundinidae	Barn Swallow	1	Accipitridae	Sharp-shinned Hawk	4
Muscicapinae	Veery	1	Accipitridae	Cooper's Hawk	4
Vireonidae	Red-eyed Vireo	1	Accipitridae	Red-tailed Hawk	4
Thraupinae	Scarlet Tanager	1	Falconidae	American Kestrel	4
Icterinae	Bobolink	1	Falconidae	Merlin	4
WINTERS IN MEXICO			Falconidae	Peregrine Falcon	4
Trochilidae	Black-chinned Hummingbird	2	Charadriidae	Killdeer	4
Trochilidae	Calliope Hummingbird	2	Scolopacidae	Willet	4
Trochilidae	Rufous Hummingbird	2	Scolopacidae	Spotted Sandpiper	4
Tyrannidae	Cordilleran Flycatcher	2	Scolopacidae	Marbled Godwit	4
WINTERS FROM MEXICO SOUTHWARD			Columbidae	Mourning Dove	4
Accipitridae	Broad-winged Hawk	3	Strigidae	Burrowing Owl	4
Strigidae	Flammulated Owl	3	Apodidae	White-throated Swift	4
Apodidae	Vaux's Swift	3	Trochilidae	Ruby-throated Hummingbird	4
Apodidae	Black Swift	3	Alcedinidae	Belted Kingfisher	4
Trochilidae	Broad-tailed Hummingbird	3	Picidae	Yellow-bellied Sapsucker	4
Tyrannidae	Least Flycatcher	3	Picidae	Red-naped Sapsucker	4
Tyrannidae	Willow Flycatcher	3	Tyrannidae	Hammond's Flycatcher	4
Tyrannidae	Great Crested Flycatcher	3	Hirundinidae	Tree Swallow	4
Tyrannidae	Cassin's Kingbird	3	Hirundinidae	Violet-green Swallow	4
Tyrannidae	Western Kingbird	3	Hirundinidae	Northern Rough-winged Swallow	4
Muscicapinae	Swainson's Thrush	3	Sylviinae	Ruby-crowned Kinglet	4
Vireonidae	Bell's Vireo	3	Muscicapinae	Hermit Thrush	4

Table 2. (continued)

Family/ Subfamily	Species	Wintering Area	Family/ Subfamily	Species	Wintering Area
Mimidae	Gray Catbird	4	Muscicapinae	Townsend's Solitaire	5
Motacillidae	Water Pipit	4	Mimidae	Sage Thrasher	5
Bombycillidae	Cedar Waxwing	4	Motacillidae	Sprague's Pipit	5
Vireonidae	Solitary Vireo	4	Laniidae	Loggerhead Shrike	5
Vireonidae	Yellow-throated Vireo	4	Cardinalinae	Lazuli Bunting	5
Parulinae	Orange-crowned Warbler	4	Cardinalinae	Black-headed Grosbeak	5
Parulinae	Nashville Warbler	4	Emberizinae	Green-tailed Towhee	5
Parulinae	Yellow Warbler	4	Emberizinae	Chipping Sparrow	5
Parulinae	Yellow-rumped Warbler	4	Emberizinae	Clay-colored Sparrow	5
Parulinae	Townsend's Warbler	4	Emberizinae	Brewer's Sparrow	5
Parulinae	Black-and-white Warbler	4	Emberizinae	Vesper Sparrow	5
Parulinae	Ovenbird	4	Emberizinae	Lark Sparrow	5
Parulinae	Northern Waterthrush	4	Emberizinae	Sage Sparrow	5
Parulinae	Common Yellowthroat	4	Emberizinae	Lark Bunting	5
Parulinae	Wilson's Warbler	4	Emberizinae	Baird's Sparrow	5
Parulinae	Yellow-breasted Chat	4	Emberizinae	Fox Sparrow	5
Emberizinae	Savannah Sparrow	4	Emberizinae	Swamp Sparrow	5
Emberizinae	Grasshopper Sparrow	4	Emberizinae	White-crowned Sparrow	5
Emberizinae	Lincoln's Sparrow	4	Emberizinae	McCown's Longspur	5
WINTERS IN U.S. AND MEXICO			Emberizinae	Chestnut-collared Longspur	5
Accipitridae	Northern Goshawk	5	Icterinae	Yellow-headed Blackbird	5
Accipitridae	Ferruginous Hawk	5	Fringillidae	Cassin's Finch	5
Falconidae	Prairie Falcon	5	Fringillidae	American Goldfinch	5
Charadriidae	Mountain Plover	5	RESIDENT IN U.S. & WINTERS SOUTHWARD		
Scolopacidae	Long-billed Curlew	5	Accipitridae	Golden Eagle	6
Strigidae	Long-eared Owl	5	Alaudidae	Horned Lark	6
Strigidae	Short-eared Owl	5	Certhiidae	Brown Creeper	6
Caprimulgidae	Common Poorwill	5	Muscicapinae	Eastern Bluebird	6
Picidae	Lewis' Woodpecker	5	Muscicapinae	Western Bluebird	6
Picidae	Williamson's Sapsucker	5	Muscicapinae	American Robin	6
Tyrannidae	Dusky Flycatcher	5	Mimidae	Northern Mockingbird	6
Tyrannidae	Eastern Phoebe	5	Emberizinae	Rufous-sided Towhee	6
Tyrannidae	Say's Phoebe	5	Emberizinae	Song Sparrow	6
Troglodytidae	Rock Wren	5	Emberizinae	Dark-eyed Junco	6
Troglodytidae	House Wren	5	Icterinae	Red-winged Blackbird	6
Troglodytidae	Sedge Wren	5	Icterinae	Western Meadowlark	6
Troglodytidae	Marsh Wren	5	Icterinae	Brewer's Blackbird	6
Muscicapinae	Mountain Bluebird	5	Fringillidae	Pine Siskin	6



# TURKEY VULTURE

*Cathartes aura*  
Cathartidae



Summer Resident (may occasionally winter in westernmost portion of region)

WINTERING AREA: 4

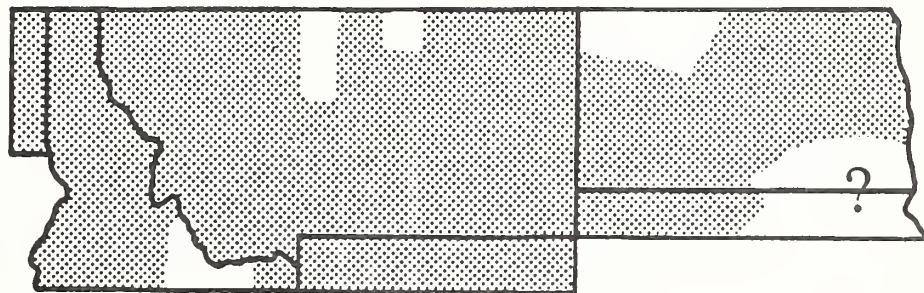
**HABITAT REQUIREMENTS:** Open areas from plains into the mountains, generally associated with drier brushy woodlands and grasslands. Usually nests on a cliff ledge or in a cliff niche, occasionally sheltered in a cave or hollow stump, only rarely on a dead snag.

**FEEDING:** A scavenger par excellence that consumes a tremendous variety of carrion; if it's animal matter and dead, it's food. Prey is located by sight and by smell while soaring at varied heights.

**STATUS AND MANAGEMENT:** Numbers have decreased significantly in Montana and declined in Idaho, as well. Data are insufficient from the remainder of the region. For the West as a whole,

there have been slight declines but considering the entire North American range, the picture is mixed with an apparent increase following declines due in part to widespread eggshell thinning attributable to pesticides ingested in contaminated prey. Adequacy of roost sites free from disturbance for this communally-roosting species may be an important component of maintaining local populations. Favored communal roost sites in winter in eastern U.S. are comprised of stands of large conifers (Thompson et al., 1990).

**FURTHER READING:** Arad et al., 1989; Clark and Ohmart, 1985; Coleman and Fraser, 1989; Prior, 1990; Wilbur and Jackson, 1983.



# OSPREY

*Pandion haliaetus*  
Accipitridae

Summer Resident

WINTERING AREA: 4

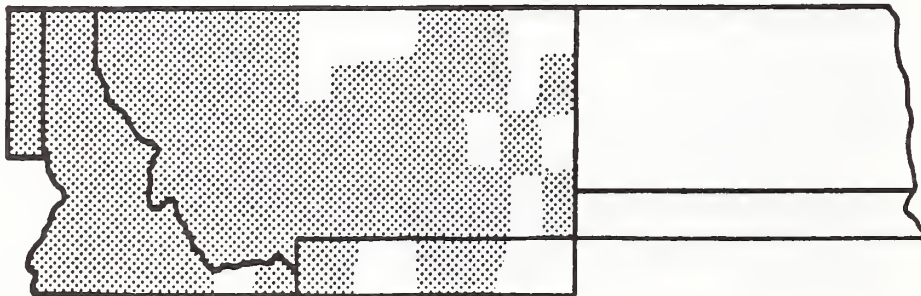
**HABITAT REQUIREMENTS:** Closely associated with rivers and lakes over a wide altitudinal range. Nests primarily in large trees, either live or dead but usually with broken tops, also nests on human-built structures, and occasionally on cliff ledges. Nests are often reused in subsequent years.

**FEEDING:** Nearly exclusively feeds on fish, captured by hovering over water and then diving (generally from 20-30 meters) onto prey, plunging feetfirst to grasp fish in their talons. Also captures fish Bald Eagle-style by snatching prey directly from water following low flight. Only rarely takes rodents, birds, or other small vertebrates, and crustaceans.

**STATUS AND MANAGEMENT:** Numbers are small but increasing significantly in Montana and increasing slightly in Idaho. Declined precipitously

throughout North America as a result of pesticide-induced eggshell thinning, but has responded well to conservation efforts in many areas. Eggshell thinning and reduced hatching success resulting from pesticide contamination continue due to exposure in wintering areas outside of the U.S. and from contaminated prey consumed on the North American breeding grounds (Steidl et al., 1991). Readily nests on human-built nesting platform atop pole. Ospreys do not maintain large exclusive breeding territories but instead defend only the immediate area around the nest site, thus enabling unusually high nest densities if adequate supply of fish is present.

**FURTHER READING:** Bird, 1983; Edwards, 1989; Hagan and Walters, 1990; Johnsgard, 1990; Poole, 1989; Steidl and Griffin, 1991; Van Daele and Van Daele, 1982.



# NORTHERN HARRIER

*Circus cyaneus*

Accipitridae

Permanent Resident in western portion of region and  
Summer Resident from eastern Montana through  
North Dakota

WINTERING AREA: 4

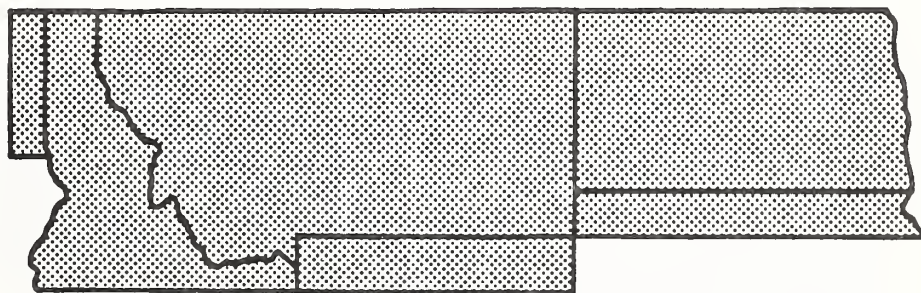
**HABITAT REQUIREMENTS:** Prairies, open shrublands, wet meadows, marshes, croplands. Nests generally are on the ground but occasionally elevated in low shrubs, emergent vegetation, or low, dense riparian thickets. Avoids forested areas and most often found in the vicinity of water.

**FEEDING:** Characteristically forages by coursing low over the ground systematically searching for prey by sound as well as by sight. Feeds primarily on small mammals, especially voles, but will shift to fledgling passerines when available seasonally; also takes snakes, frogs, large insects, and even carrion.

**STATUS AND MANAGEMENT:** Montana populations have declined significantly, with Idaho

showing a steady decline, as well. Until recently, North Dakota populations have been stable. Northern Harriers have declined steadily throughout their range until recent years when the magnitude of the decline increased significantly, with dramatic reductions in Wyoming and North Dakota in the most recent surveys. Nesting areas subject to heavy livestock grazing are particularly vulnerable, especially during dry years. Destruction of favored wetland habitats and eggshell thinning due to pesticide ingestion have been implicated in the longterm decline of populations.

**FURTHER READING:** Barnard et al., 1987; Hamerstrom, 1986; Johnsgard, 1990; Rice, 1982; Simmons, 1988; Temeles, 1989.





# SHARP-SHINNED HAWK

*Accipiter striatus*

Accipitridae

**Permanent Resident** throughout region but more commonly a **Summer Resident** from central Montana through North Dakota

**WINTERING AREA:** 4

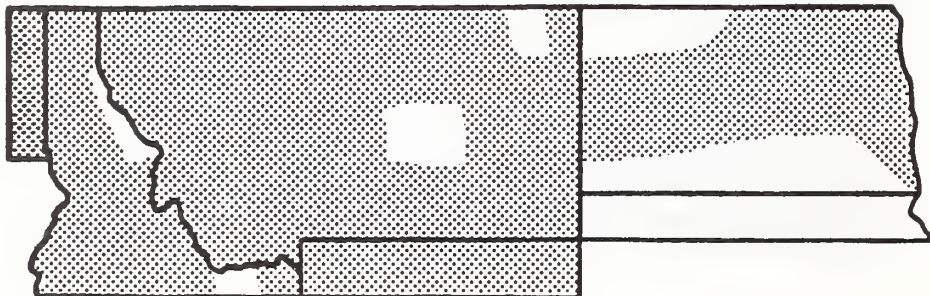
**HABITAT REQUIREMENTS:** Favors coniferous or mixed forests and open woodlands. Nests in trees, usually conifers, although aspens and riparian deciduous trees are not uncommonly used in the region. Rarely found outside of woodland or forested areas.

**FEEDING:** A specialist on small birds, only rarely taking small mammals, frogs, lizards, and large insects. Pursues prey with a quick, often erratic dash among the trees and seizes birds in flight or from their perches.

**STATUS AND MANAGEMENT:** Sample sizes for BBS data are rather limited but nevertheless indicate highly significant declines in Montana and North Dakota breeding populations. Nationally, significant declines in breeding populations occurred during the 1970's (especially in the East), attributable

in part to nesting failure due to eggshell thinning. More recently, numbers appear to have stabilized and even increased in some areas. Tends to nest in dense, even-aged coniferous forests 25-60 years old (Reynolds et al., 1982), especially with large crown canopy volumes (Moore and Henny, 1983), usually near water (Reynolds et al., 1982). Sensitive to forest fragmentation in old-growth Douglas fir/ponderosa pine (Aney, 1984; Rosenberg and Raphael, 1986). Sharp-shinned Hawks are highly vulnerable to timber harvest because of their specific nesting habitat requirements; active and prospective nest sites should not be precommercially or commercially thinned (Reynolds, 1983).

**FURTHER READING:** Henny et al., 1985; Johnsgard, 1990; Kerlinger and Lehrer, 1982; Platt, 1976; Reynolds and Meslow, 1984.





# COOPER'S HAWK

*Accipiter cooperii*

Accipitridae

Permanent Resident throughout region but more commonly a Summer Resident from eastern Montana through North Dakota

WINTERING AREA: 4

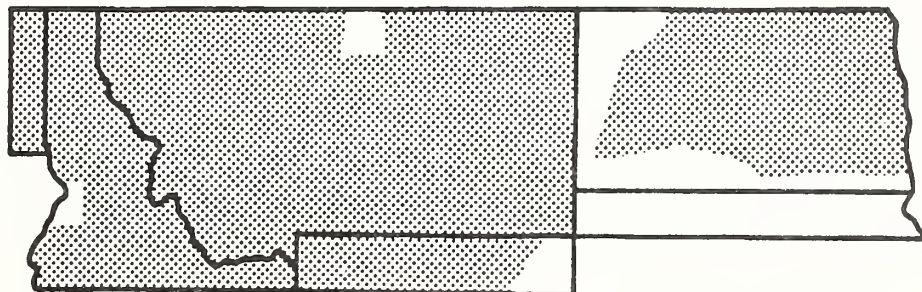
**HABITAT REQUIREMENTS:** Favors deciduous or mixed mature forest or woodland, as well as open and riparian woodlands. Nests in deciduous trees, especially large aspens, less commonly in conifers, often close to water.

**FEEDING:** Feeds extensively on young songbirds but takes proportionately more mammalian prey than the Sharp-shinned Hawk; only rarely includes amphibians in diet but reptiles may be important component in more arid areas. Hunts with rapid, relatively low flight among trees to flush avian prey and capture them in air.

**STATUS AND MANAGEMENT:** BBS data are scant but numbers appear to be declining throughout the region, especially in North Dakota. Nationally, Cooper's Hawks have declined significantly in association with pesticide-induced eggshell thinning.

Populations largely stabilized since the early 1970's although numbers appear to be declining in most recent survey years. Officially listed as Vulnerable in Canada. When nesting in coniferous forest or mixed forest, tends to nest in older even-aged stands; favors north-facing slopes for nest placement (Reynolds et al., 1982). Sensitive to forest fragmentation in old-growth ponderosa pine/Douglas-fir (Aney, 1984). Cooper's Hawks are highly vulnerable to timber harvest because of their specific nesting habitat requirements: active and prospective nest sites should not be precommercially or commercially thinned (Reynolds, 1983).

**FURTHER READING:** Asay, 1987; Bielefeldt et al., 1992; Henny et al., 1985; Johnsgard, 1990; Kennedy and Johnson, 1986; Reynolds and Meslow, 1984; Rosenfield et al., 1991.



# NORTHERN GOSHAWK

*Accipiter gentilis*  
Accipitridae

Permanent Resident except in North Dakota and easternmost Montana where it is a Winter Resident only.

WINTERING AREA: 5

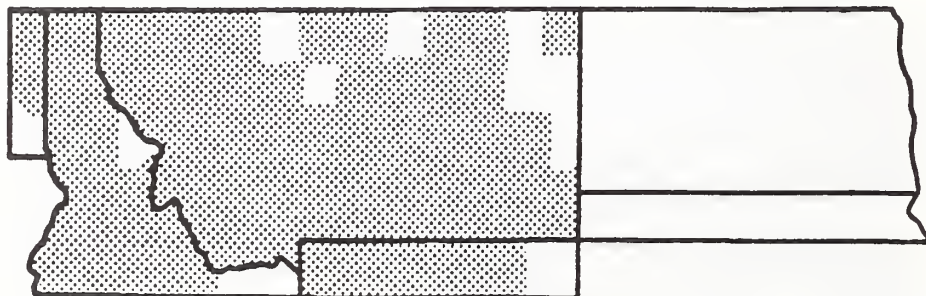
**HABITAT REQUIREMENTS:** Coniferous or mostly coniferous forest and open woodland with significant old-growth component. Nests in large, old-growth conifers or sometimes aspens, especially near water. Nests are often repaired and reused.

**FEEDING:** Diet comprised of only slightly more birds than mammals. Avian prey are primarily gallinaceous birds and larger songbirds, mammalian prey are mostly ground squirrels and lagomorphs; only rarely capture snakes and large insects. Females take considerably larger prey than males, with little overlap between the two. Attacks prey from perch to a greater extent than the other accipiters, but often forages in a low patrolling flight to flush avian prey.

**STATUS AND MANAGEMENT:** Virtually absent from the BBS database. Numbers apparently have declined precipitously in recent years in association with the disappearance and fragmentation of old-growth coniferous forest. Recently listed as a candidate species for Threatened and Endangered

status throughout its range in the U.S. Closely associated during breeding season with dense old-growth or mature coniferous forests having multi-layered canopies with average canopy closures of 80-88 percent; favors nesting sites near water on moderate north-facing slopes (Hayward and Escano, 1989; Hejl and Woods, 1991; Mannan and Meslow, 1984; Reynolds et al., 1982). Home ranges are quite large, thus requiring extensive forest stands. Northern Goshawks are highly vulnerable to most timber management activities because of their specific nesting habitat requirements; active and prospective nest sites should not be precommercially or commercially thinned (Reynolds, 1983). Populations irrupt southward on a ten year cycle in association with crash of prey populations in northern areas, although this pattern is most pronounced in eastern portion of range.

**FURTHER READING:** Henny et al., 1985; Johnsgard, 1990; Mueller et al., 1977; Reynolds and Meslow, 1984; Sherrod, 1978.



# BROAD-WINGED HAWK

*Buteo platypterus*  
Accipitridae

Summer Resident

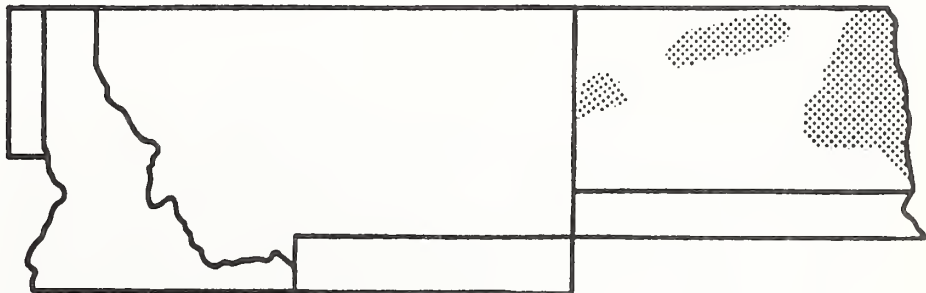
WINTERING AREA: 3

**HABITAT REQUIREMENTS:** Mature deciduous or mixed forest, especially associated with flood plains of major watercourses and lakes. Usually nests in deciduous trees.

**FEEDING:** Primary prey are small mammals (mice, voles, lagomorphs, squirrels, shrews) but fledglings and nestlings of smaller birds are often important components of diet; also takes amphibians (especially frogs), reptiles, and insects. Forages by dropping onto prey from an elevated perch.

**STATUS AND MANAGEMENT:** Primarily an eastern species, the Broad-winged Hawk does not appear in BBS data for the region due to its rarity here. Nationally, populations appear relatively stable with modest increases in some regions and slight decreases in others. Suitable nesting habitat is limited primarily to eastern North Dakota. Extremely vulnerable to tropical deforestation (Morton, 1992).

**FURTHER READING:** Fitch, 1974; Johnsgard, 1990; Matray, 1974; Rosenfield, 1984; Rusch and Doerr, 1972.





# SWAINSON'S HAWK

*Buteo swainsoni*  
Accipitridae

Summer Resident

WINTERING AREA: 1

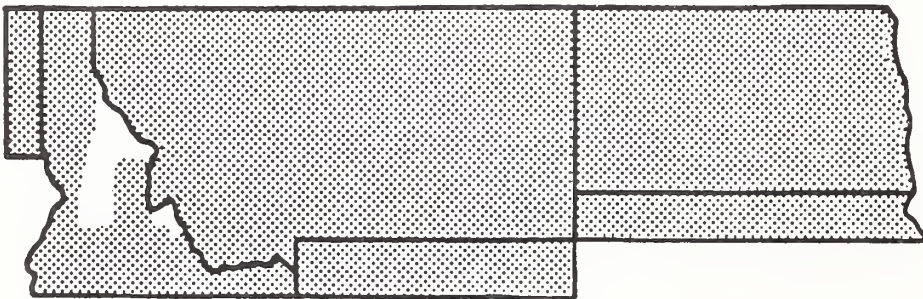


**HABITAT REQUIREMENTS:** Shrub steppe, prairies, open woodland, shelterbelts, cultivated land with scattered trees. Nests typically in isolated deciduous trees, much less commonly in shrub or conifer, on cliff ledge or ground in treeless areas. Often refurbish and use abandoned nests of corvids and other *Buteo* species.

**FEEDING:** Rodents (especially ground squirrels and pocket gophers) comprise most of diet but also consumes lagomorphs and a wide variety of small vertebrates (including birds), as well as beetles and grasshoppers which are sometimes taken in large numbers. Forages primarily by soaring at moderate heights and stooping onto terrestrial prey but also frequently swoops down onto prey from elevated perches.

**STATUS AND MANAGEMENT:** Numbers have increased significantly in North Dakota and Montana, and remained fairly steady in Idaho. In the West as a whole, numbers appear to have increased slightly, with most of the increase occurring in the northern portion of the range. Egg contamination with low to moderate levels of organochlorine pesticides, PCB's, and mercury has been found within the region (Stendell et al., 1988). Often interspecifically territorial with Red-tailed Hawks when nesting. Swainson's Hawks are more tolerant of landscapes having agricultural habitats interspersed with grasslands than are Ferruginous Hawks (Gilmer and Stewart, 1984; Schmutz, 1989).

**FURTHER READING:** Bechard et al., 1990; Dunkle, 1977; Fitzner, 1978; Johnsgard, 1990; Kirkley and Gessaman, 1990a, b; Restani, 1991.





# RED-TAILED HAWK

*Buteo jamaicensis*

Accipitridae

Permanent Resident in western portion of region, mostly Summer Resident from north-central Montana through North Dakota

WINTERING AREA: 4

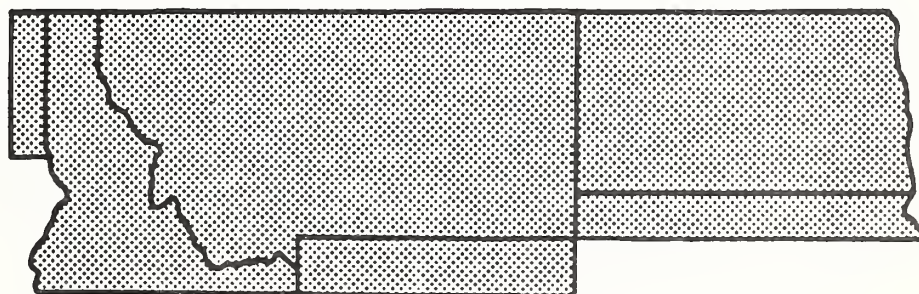
**HABITAT REQUIREMENTS:** Wide variety of open woodland and other open country with scattered trees or isolated woodlots. Prefers to nest in large deciduous trees (and ponderosa pines) but will use cliff ledge or powerline tower where suitable trees are unavailable. May alternate among several nests over time.

**FEEDING:** Rodents and lagomorphs predominate but also take birds, reptiles (especially snakes), large insects, amphibians, crayfish, fish, and even carrion. Forages primarily by soaring at moderate heights and stooping onto terrestrial prey but also frequently swoops down onto prey from elevated perches.

**STATUS AND MANAGEMENT:** Populations appear to be increasing significantly in Montana, and relatively stable elsewhere in the region. Overall,

populations have posted a small but significant gain, especially in the West, but numbers are down significantly in some areas (including the Canadian prairie provinces) in the most recent survey years. Often interspecifically territorial with Swainson's Hawks when nesting, especially when favored prey densities are sparse. This is the most common and widespread species of *Buteo* in North America, and the most tolerant of human disturbance. Increases in recent years may have been at the expense of Swainson's and Ferruginous Hawks which are less tolerant of habitat alteration and human disturbance.

**FURTHER READING:** Andersen, 1990; Gilmer et al., 1983; Janes, 1984a, b; Johnsgard, 1990; Kirkley and Gessaman, 1990b; Restani, 1991; Rothfels and Lein, 1983.



# FERRUGINOUS HAWK

*Buteo regalis*  
Accipitridae

Summer Resident

WINTERING AREA: 5

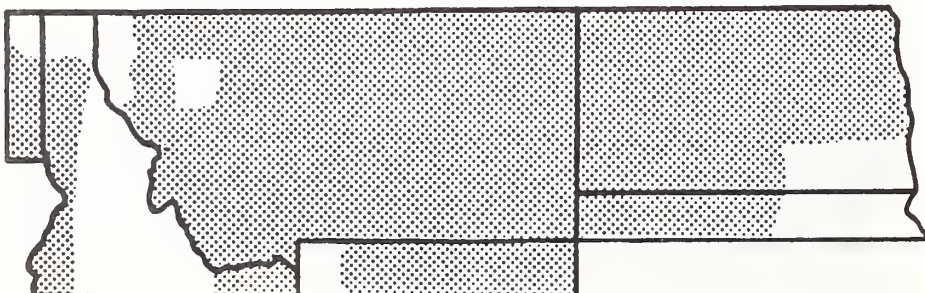
**HABITAT REQUIREMENTS:** Dry open country, especially native prairies, but also shrubsteppe, plains, and badlands. Preferred nest site is in a tree (deciduous in eastern portion of region, coniferous in western portion), but also nests on cliff ledge, atop rock outcrop, in deciduous shrub, or on elevated ground, and on human-built structures, including haystacks. Elevated nests are often used perennially.

**FEEDING:** Primarily small mammals, especially ground squirrels, jackrabbits, and pocket gophers, but also takes birds, reptiles, and large insects. Foraging behaviors are varied: often attacks prey by a low, rapid, flight and pursuit, also swoops onto prey from elevated perches or soars at varied heights in search of prey, on which it often drops after pulling up and hovering in flight.

**STATUS AND MANAGEMENT:** Numbers appear to have increased significantly in Montana, slightly in North Dakota, and decreased somewhat in Idaho. Populations appear to be stable overall following marked declines in many areas beginning in the late

1940's, although the Ferruginous Hawk is still uncommon in many parts of its breeding range. Listed as Threatened in Canada and as a candidate for Threatened status in the U.S. Loss of suitable habitat to agricultural conversion and overgrazing by livestock is the primary problem faced by the species. Egg contamination with low to moderate levels of organochlorine pesticides, PCB's, and mercury has been found within the region (Stendell et al., 1988). Optimal breeding habitat consists of extensive ungrazed or lightly grazed prairie grassland with scattered elevated nesting sites (Ensign, 1983); cultivated croplands cannot sustain populations (Gilmer and Stewart, 1983). Power-line towers providing secure platforms are used extensively as nest sites in North Dakota (Gilmer and Stewart, 1983). Nesting productivity often varies in synchrony with jackrabbit or ground squirrel abundance (Lokemoen and Duebbert, 1976).

**FURTHER READING:** Blair, 1978; Fitzner et al., 1977; Gilmer et al., 1985; Johnsgard, 1990; Restani, 1991; Smith et al., 1981; Woffinden and Murphy, 1989.



# GOLDEN EAGLE

*Aquila chrysaetos*

Accipitridae

Permanent Resident except in eastern portion of region (central and eastern North Dakota) where it is a Winter Resident

WINTERING AREA: 6

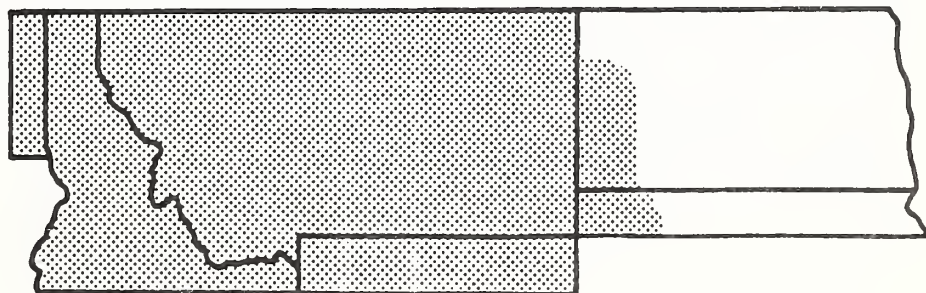
**HABITAT REQUIREMENTS:** Open habitats in mountains and hill country most commonly but also prairies and other grasslands. Nests on cliff ledge or in cliff niche, less commonly in large tree. Pairs often alternate among favored nest sites which may be used over many years.

**FEEDING:** Predominant prey are jackrabbits, but other mammals (especially ground squirrels), birds, reptiles, and even carrion are consumed. Forages by soaring widely and by swooping down onto prey from the air or from an elevated perch. Pair occasionally hunts in tandem. Requires thermals or topographically-induced updrafts to gain sufficient altitude for energetically efficient hunting.

**STATUS AND MANAGEMENT:** Slight declines are apparent in Idaho and Montana, with relatively steady numbers in North Dakota. Fewer than 100 nesting pairs were estimated for all of western North Dakota in the mid-1980's, with the recommendation that maintenance of suitable habitat should be a

management priority (Allen 1986, 1987). Populations in the West generally have stabilized in most areas following slight but sustained local declines, especially where encroachment of suburban sprawl and agricultural conversion of prairie habitat have occurred. Widely persecuted in the past for depredations on livestock (primarily lambs), which often occur as a result of poor livestock management practices (Brown and Watson, 1964;) in association with population crashes of primary prey species (especially jackrabbits) and limited availability of alternate prey (Matchett and O'Gara, 1987). Numbers continue to be impacted adversely by inadvertent powerline electrocutions, illegal shooting, and death from ingestion of poisoned carcasses intended for coyotes. Lead poisoning also may be an important and underestimated problem in Golden Eagles (Craig et al, 1990).

**FURTHER READING:** Beecham and Kochert, 1975; Collopy, 1984; Johnsgard, 1990; Steenhof et al., 1983.





# AMERICAN KESTREL

*Falco sparverius*

Falconidae

Summer Resident from central Montana eastward;  
Permanent Resident elsewhere in region

WINTERING AREA: 4

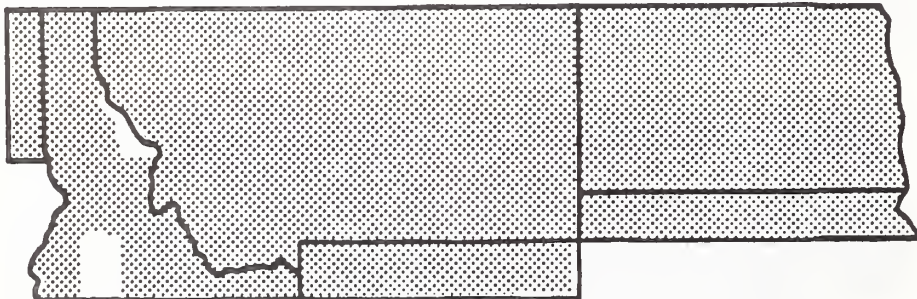
**HABITAT REQUIREMENTS:** Open country with or without scattered trees, including prairie, grasslands, mountain meadows, shrubsteppe, riparian woodland, and agricultural areas. Nests in cavities in trees, buildings, or niches in cliffs or rocks; does not excavate its own cavity.

**FEEDING:** Highly insectivorous, feeding heavily on grasshoppers, but also takes a wide variety of small vertebrates, especially rodents and birds which together comprise a greater proportion of diet biomass than do insects. Hovers and pounces on terrestrial prey or swoops down from elevated perch.

**STATUS AND MANAGEMENT:** Numbers have increased throughout the region, significantly so in

Montana. Populations appear stable in North America overall, but recent significant declines have occurred in scattered areas of the midwest and southeast, and numbers are down slightly in the West when viewed as a whole. Breeding territory size has been shown to vary inversely with small rodent densities (Gard and Bird, 1990). Availability of suitable cavities for nest sites may depend heavily on Northern Flickers and other large woodpeckers in some areas. American Kestrels will use nest boxes.

**FURTHER READING:** Cade, 1982; Collopy, 1977, Johnsgard, 1990; Mills, 1976; Mueller, 1977; Sedgwick and Knopf, 1990.





# MERLIN

*Falco columbarius*

Falconidae

Summer Resident but occurs sporadically as a Winter Resident throughout region

WINTERING AREA: 4

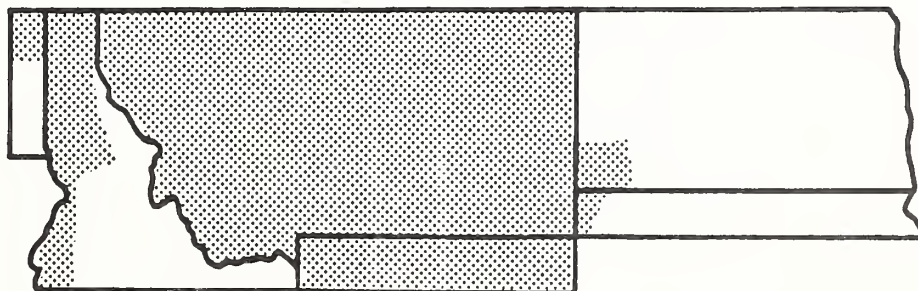
**HABITAT REQUIREMENTS:** Open habitats at all elevations, often associated with grasslands and shrub steppe. For nesting, relies heavily on abandoned magpie nests in large coniferous trees (most often ponderosa pines) in open woodland close to prairie or other grassland habitat. In other areas, Merlins are known to use nests of corvids (sometimes hawks) in deciduous trees or shrubs in open woodlands; where tree sites are unavailable, nesting may occur on the ground beneath shrubs or on cliff ledges, or rarely in cavities of standing snags.

**FEEDING:** Diet is comprised almost wholly of songbirds found in open habitats which are captured most often by direct, very fast flight, rather than by stooping on flying prey from above as do most larger falcons. Merlins also will hunt from elevated perches and by typical falcon-stoop from above. Very small portion of diet (<10%) consists of smaller rodents and large insects (especially dragonflies), but only rarely includes other small vertebrates.

**STATUS AND MANAGEMENT:** Although sample sizes are small, BBS data indicate a highly significant decline in numbers in Idaho and Montana, with

no data from North Dakota. Widespread eggshell thinning occurred in North American populations through the 1970's concurrent with widespread decline in numbers. Breeding range contraction and population decline has been attributed to pesticide contamination and destruction of native prairie habitats; pesticide contamination associated with significantly reduced eggshell thicknesses continues to be of concern in the region (Becker and Sieg, 1987a). A rather uncommon breeding bird in the region with most breeding and wintering records from Montana, in contrast to only a handful of nesting records known from widely scattered locations in North Dakota. Home ranges are very large and preferred hunting habitats consist of interspersed areas of grassland and shrub steppe (Becker and Sieg, 1987b); removal of shrubs or conversion of sagebrush/grassland to agricultural cropland markedly reduces quality of foraging habitat (Becker and Sieg, 1987b).

**FURTHER READING:** Becker and Sieg, 1985; Buchanan et al., 1988; Cade, 1982; Johnsgard, 1990; Schmutz et al., 1991; Sieg and Becker, 1990; Sodhi et al., 1991; Warkentin et al., 1990.



# PEREGRINE FALCON

*Falco peregrinus*  
Falconidae

Summer Resident

WINTERING AREA: 4

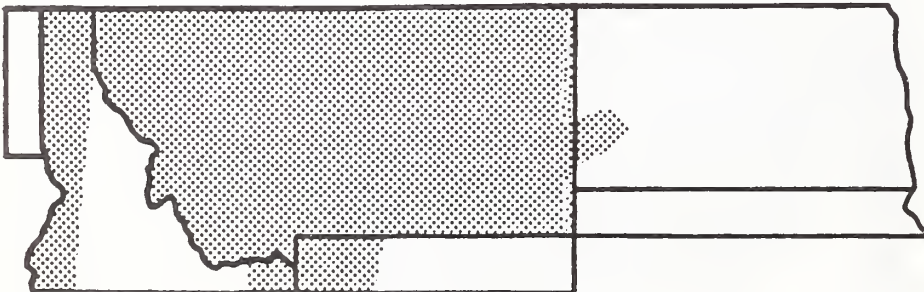
**HABITAT REQUIREMENTS:** A cliff-nesting falcon of open habitats, most commonly associated with open woodlands, but found from prairie to alpine tundra. Cliff nests are used perennially. Rarely nests in trees using abandoned corvid or hawk nest or cavity.

**FEEDING:** A specialist on avian prey, especially doves, waterfowl, shorebirds, and a wide variety of passerines. Strikes prey in air following extremely fast, low flight to flush birds from ground, or stoops on prey from above, but also attacks passing birds from stationary, elevated perch. Opportunistically includes small mammals in diet.

**STATUS AND MANAGEMENT:** No BBS data exist for Peregrines in the region due to the species rarity; what few data there are, indicate a slight declining trend in the West as a whole. The subspecies that

breeds in our region is Federally listed as Endangered, but status is now under review as a result of apparent improvement in overall population numbers. The arctic-breeding subspecies is federally listed as Threatened and a third subspecies is listed as Vulnerable in Canada. Extirpated from much of its former range as a result of habitat destruction and pesticide contamination that produced extensive eggshell thinning (which continues to be a problem in some parts of the U.S. [e.g., see Steidl et al., 1991]); now being reintroduced in portions of its previous range, with more than 400 captive-reared birds released in the Rockies since 1976.

**FURTHER READING:** Cade, 1982; Cade et al., 1988; Court et al., 1988; Craig, 1986; Hunter et al., 1988; Johnsgard, 1990; Ratcliffe, 1980; Schmutz et al., 1991; Temple, 1978.



# PRAIRIE FALCON

*Falco mexicanus*

Falconidae

Summer Resident or Permanent Resident

WINTERING AREA: 5

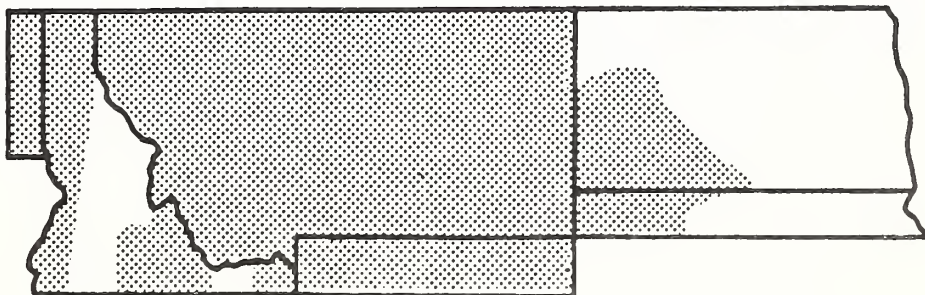
**HABITAT REQUIREMENTS:** A cliff-nesting species of open habitats from prairie to alpine tundra; most commonly associated with arid habitats such as shortgrass prairie and shrub steppe. Cliff nests are regularly reused. Rarely nests in abandoned raven nest in tree or on power-transmission tower.

**FEEDING:** Mostly birds but also preys substantially on rodents (which may comprise most of diet in some areas), lagomorphs, and other small mammals, with reptiles and large insects accounting for only 5-10% of diet. Flushes prey with low, searching flight, stoops on avian prey from high soaring position, and searches for prey from elevated perch.

**STATUS AND MANAGEMENT:** Numbers appear to be relatively stable throughout the region, as also appears to be the case elsewhere, although there is a suggestion of slight but sustained decline in numbers

overall; BBS data are rather scant. The breeding population in North Dakota has been estimated at only 125 pairs (Allen, 1987). Pesticide contamination has led to eggshell thinning and mercury poisoning but the species has not experienced the extensive range reduction seen in Peregrine Falcons; in Montana, significant eggshell thinning correlated with elevated organochlorine residues has been associated with increased land areas devoted to alfalfa production (Leedy, 1972). Permanent residents from higher elevations often move to lower elevations during the winter where they hunt over grain fields and prey heavily on Horned Larks (Enderson, 1964).

**FURTHER READING:** Allen et al., 1986; Cade, 1982; Holthuijzen, 1990; Johnsgard, 1990; Marti and Braun, 1975; Schmutz et al., 1991.



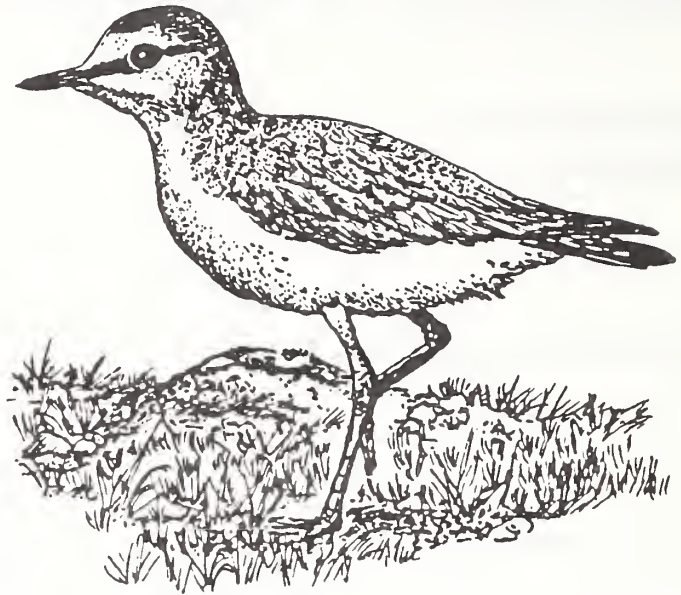


# MOUNTAIN PLOVER

*Charadrius montanus*  
Charadriidae

Summer Resident

WINTERING AREA: 5



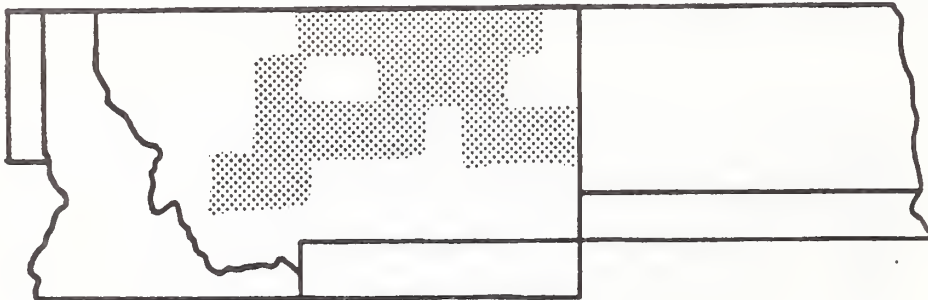
**HABITAT REQUIREMENTS:** Shortgrass prairie, drier open shrubland. Nests on ground, often far from water in arid or semi-arid conditions.

**FEEDING:** Forages on the ground, nearly exclusively on insects (especially beetles and grasshoppers), by picking items from the substrate.

**STATUS AND MANAGEMENT:** BBS data are inadequate to project population trends. North Dakota population has been extirpated. Listed as Endangered in Canada and as a candidate species for federal Threatened and Endangered status in the U.S. Range has contracted severely as prairie habitats have been converted to agriculture. Nesting Mountain Plovers prefer shortgrass prairie areas

that are flat, moderately grazed, and provide short vegetation, hence most significant populations remaining in the northern region nest preferentially in prairie dog towns (Knowles et al., 1982; Olson, 1984); prairie dogs provide an optimum grazing pressure to maintain (but not eliminate) short-stature vegetation while selectively eliminating sagebrush (Olson, 1984). Control efforts aimed at prairie dogs will severely impact Mountain Plover populations in the region. Migrating birds often found in small flocks on plowed fields.

**FURTHER READING:** Graul, 1975; Graul and Webster, 1976; Knowles et al., 1982; Olson-Edge and Edge, 1987; Wershler, 1987.



# KILLDEER

*Charadrius vociferus*  
Charadriidae

Summer Resident (Permanent Resident in some areas)

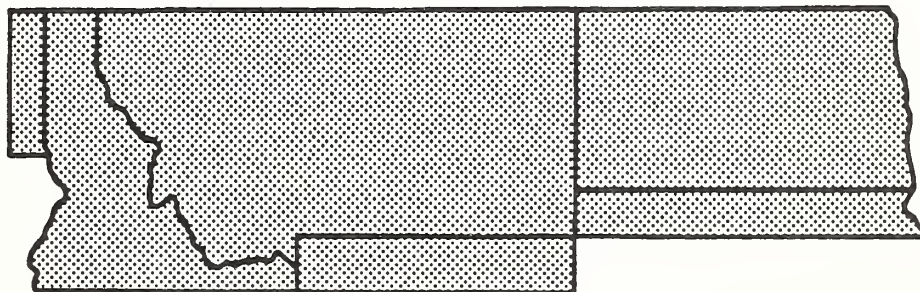
WINTERING AREA: 4

**HABITAT REQUIREMENTS:** Fields, meadows, pastures, freshwater margins; widely distributed in open habitats, most commonly at lower elevations. Nests on ground, usually with little cover, often in upland areas well away from water.

**FEEDING:** A ground forager that selectively picks food items from the substrate. Insects comprise about 75% of diet, with the remainder consisting of a wide variety of other invertebrates and occasional seeds of forbs and grasses.

**STATUS AND MANAGEMENT:** Regionally, numbers have declined slightly, although numbers appear steady over the entire North American range taken as a whole. Favors open, heavily grazed areas of prairie or pasture for nesting but may suffer decreased nesting success due to trampling of eggs and young by livestock. Migrating and wintering birds associate more closely with wetland habitats.

**FURTHER READING:** Brunton, 1988.



# WILLET

*Catoptrophorus semipalmatus*  
Scolopacidae

Summer Resident

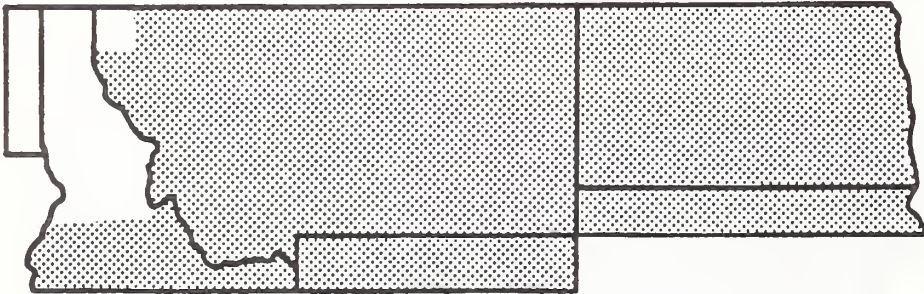
WINTERING AREA: 4

**HABITAT REQUIREMENTS:** Marshy lake margins and adjacent prairie, meadow, or other grassy area. Nests on ground, generally within 200 meters of water. Nesting areas similar to those favored by Marbled Godwits.

**FEEDING:** Feeds primarily by probing for aquatic invertebrates in soft, usually moist, substrates but also pick items from ground or water surface.

**STATUS AND MANAGEMENT:** Appears to be declining both regionally and nationally, although long-term data are scant.

**FURTHER READING:** Howe, 1982; Ryan and Renken, 1987; Sordahl, 1979; Wilcox, 1980.





# SPOTTED SANDPIPER

*Actitis macularia*  
Scolopacidae

Summer Resident

Wintering Area: 4

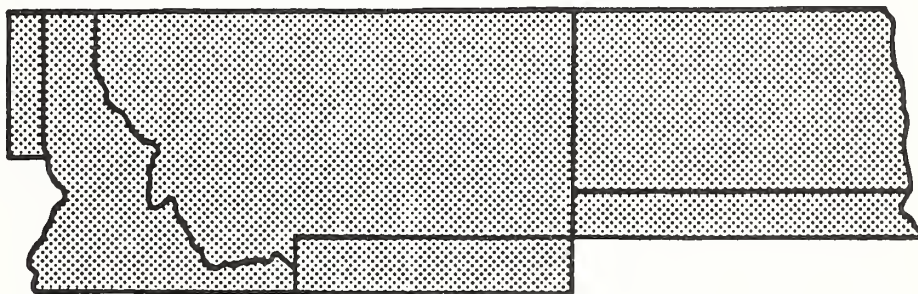
**HABITAT REQUIREMENTS:** Always in the vicinity of water from ponds and lakes to (more typically) swiftly flowing rivers and streams with rocky bottoms. Occurs across the complete altitudinal spectrum in the region, especially favoring montane areas. Nests on the ground, usually near water but occasionally at some distance in vegetation ranging from grass to shrubs and trees.

**FEEDING:** Forages on the ground adeptly capturing flying insects which comprise most of diet. Also

takes other terrestrial and aquatic invertebrates from the ground or water's surface.

**STATUS AND MANAGEMENT:** BBS data are insufficient for the region but the species appears to be declining nationally, especially in the West.

**FURTHER READING:** Alberico et al., 1991; Oring and Lank, 1986; Pickett et al., 1988.



# UPLAND SANDPIPER

*Bartramia longicauda*  
Scolopacidae

Summer Resident

WINTERING AREA: 1

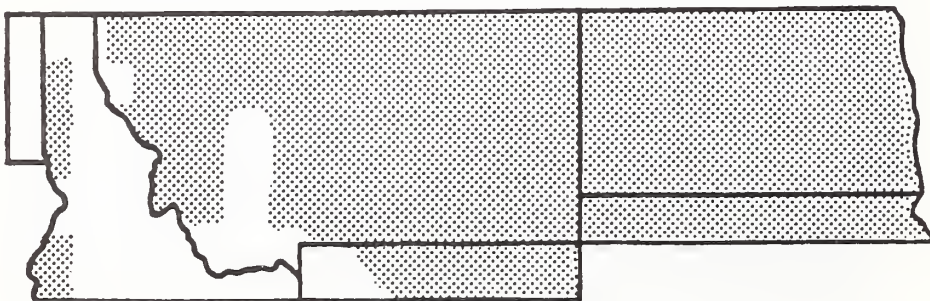
**HABITAT REQUIREMENTS:** Associated most closely with prairie grasslands, but also found in wet and dry meadows, hayfields, and pastures, seldom near water. Nest is well concealed on the ground.

**FEEDING:** Feeds primarily on insects and other terrestrial invertebrates, occasionally taking waste grain. Forages by picking items from the substrate, only rarely wading to feed.

**STATUS AND MANAGEMENT:** Loss of suitable breeding habitat has led to significant decline in the

East and contraction of range westward where overgrazing and conversion of prairie grassland to agriculture have impacted numbers. Loss of habitat to agriculture on the South American wintering grounds also has been implicated in population decline. Numbers appear to have stabilized in recent years throughout the breeding range, showing a small but significant improvement in some areas over the past 25 years.

**FURTHER READING:** Higgins and Kirsh, 1975.



# LONG-BILLED CURLEW

*Numenius americanus*  
Scolopacidae

Summer Resident

WINTERING AREA: 5

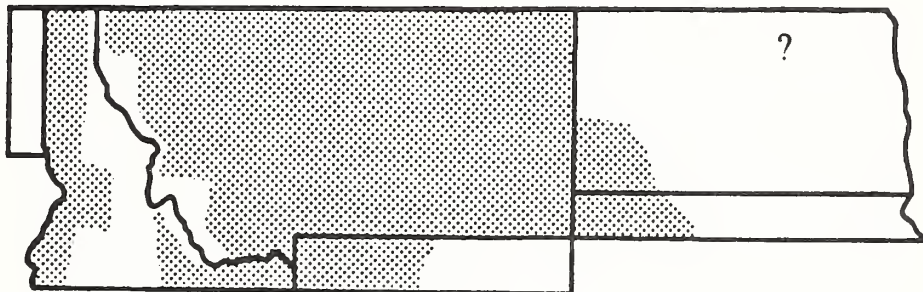
**HABITAT REQUIREMENTS:** Short-grass, grazed mixed-grass, and arid scrub prairies, meadows, not necessarily in association with water. Nests on ground, favoring well-drained, gravelly soils; although nests are generally placed well away from water, curlews often forage in wetter areas.

**FEEDING:** Forages on the ground, picking items from the substrate or probing with its bill into soft substrates for concealed prey. Feeds primarily on insects but also takes a wide variety of other invertebrates including especially worms, crustaceans, and mollusks, as well as preying on amphibians and the eggs and nestlings of small birds. Berries also

consumed, especially prior to fall migration.

**STATUS AND MANAGEMENT:** BBS data indicate a slight long-term decline but sample sizes are rather small. Suitable breeding habitat has been much reduced and breeding range continues to retrench westward. Populations appear also to have been impacted by organochlorine poisoning. Listed as a candidate species for federal Threatened and Endangered status.

**FURTHER READING:** Allen, 1980; Redmond and Jenni, 1982, 1986.





# MARBLED GODWIT

*Limosa fedoa*  
Scolopacidae

Summer Resident

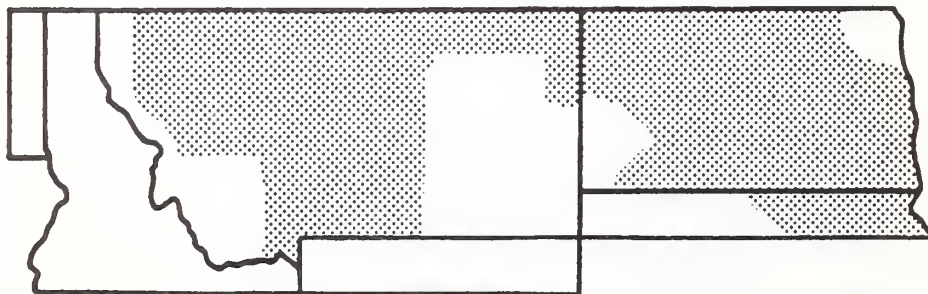
WINTERING AREA: 4

**HABITAT REQUIREMENTS:** Shortgrass prairie, wet meadows and other low-lying wet areas. Nests on ground, often in grassy areas adjacent to wetlands, occasionally farther from water in prairie habitat but does not favor areas as dry as those used by nesting Long-billed Curlews.

**FEEDING:** Forages on the ground, generally probing into soft substrates in wet areas for concealed aquatic invertebrates; also forages by picking insects and other items from the ground surface.

**STATUS AND MANAGEMENT:** Numbers have declined regionally but data are largely lacking. Breeding range has contracted as favored habitats have been converted to agriculture or degraded by overgrazing.

**FURTHER READING:** Gibson and Kessel, 1989; Ryan et al., 1984; Wishart and Sealy, 1980.



# MOURNING DOVE

*Zenaida macroura*  
Columbidae

Summer Resident but occasionally a Permanent Resident, especially in western portion of region

WINTERING AREA: 4

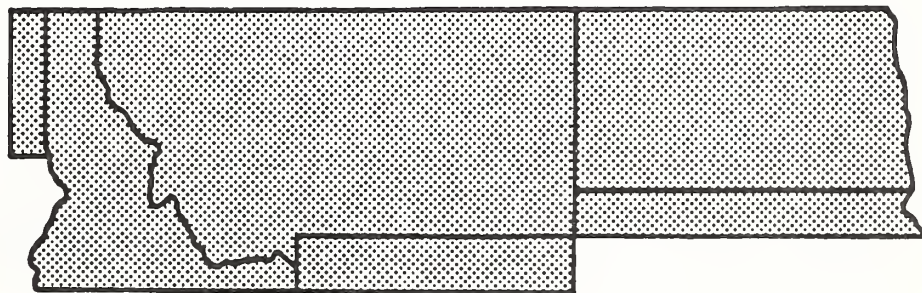
**HABITAT REQUIREMENTS:** Open woodlands (including riparian), montane meadows, cultivated lands with scattered trees and shrubs, arid grasslands near water. Nests in a wide variety of settings, most commonly in a deciduous tree but also in conifer, on abandoned tree nests of other birds, on the ground beneath shrubs in shrubsteppe and grassland habitats, and on human-built structures.

**FEEDING:** Forages on the ground taking seeds and waste grain.

**STATUS AND MANAGEMENT:** Populations appear stable in most of the region with significantly

increasing numbers in North Dakota. On a continent-wide basis, numbers have been stable generally with marked recent increases in some regions, but there is also a small but significant declining trend for the West when viewed as a whole. A popular gamebird, also a regular visitor at backyard feeders and highly tolerant of human disturbance. Capable of producing up to six broods yearly.

**FURTHER READING:** Blockstein, 1989; Howe and Flake, 1989; Leopold et al., 1981; Losito et al., 1990; Walsberg and Schmidt, 1992.



# YELLOW-BILLED CUCKOO

*Coccyzus americanus*  
Cuculidae

Summer Resident

WINTERING AREA: 1



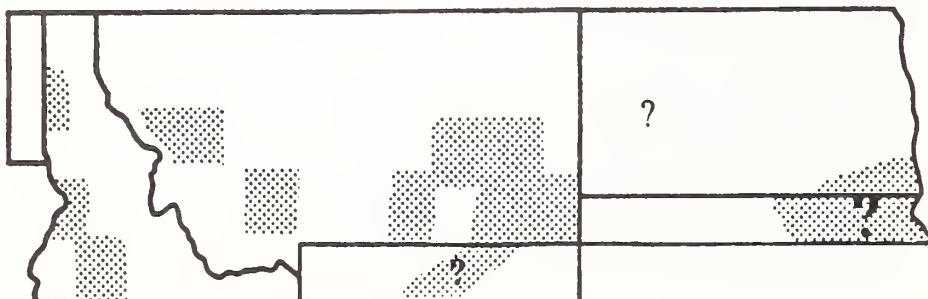
**HABITAT REQUIREMENTS:** Extensive, mature riparian woodlands, especially of cottonwoods or willows, and other open woodlands with dense understories at lower elevations. Nests in deciduous trees and shrubs.

**FEEDING:** Primarily insects, especially caterpillars, but also takes bird eggs, small frogs and lizards, berries, and fruit. Mostly forages by gleaning from vegetation, but also hawks flying insects and hovers to glean from leaves.

**STATUS AND MANAGEMENT:** Extremely rare throughout the region, most commonly found in North Dakota; populations declining significantly throughout North American range. Numbers have declined precipitously in recent years to the point of extreme rarity throughout its previous range in the

western U.S. Fragmentation and degradation of riparian woodlands by livestock, as well as drought, and prey scarcity caused by pesticides have all played roles in the species decline, although habitat loss and pesticides on the wintering grounds also are likely to have contributed to the problem. Yellow-billed Cuckoos in the West are extremely sensitive to fragmentation of mature cottonwood (and other riparian) habitat, requiring intact woodlands of at least 40 ha, preferably 80 ha or more (Laymon and Halterman, 1989). Listed as a candidate species for Threatened and Endangered status in the western U.S. Breeding productivity often varies in concert with outbreaks of caterpillars, cicadas, and other large insects. Highly vulnerable to tropical deforestation (Morton, 1992).

**FURTHER READING:** Anderson and Laymon, 1989; Laymon and Halterman, 1987.





# BLACK-BILLED CUCKOO

*Coccyzus erythrophthalmus*  
Cuculidae

Summer Resident

WINTERING AREA: 1

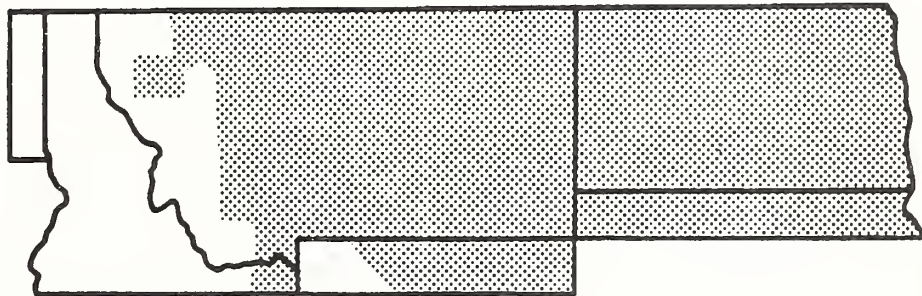
**HABITAT REQUIREMENTS:** Forest and open woodland of all types, generally at lower elevations, prairie thickets and shelterbelts. Nests in trees or shrubs.

**FEEDING:** Primarily insects, especially caterpillars, but also takes bird eggs, small frogs and lizards, berries, and fruit. Forages in trees by gleaning arthropods from vegetation.

**STATUS AND MANAGEMENT:** Numbers appear to be low but stable in the region. Overall, popula-

tions appear to be stable throughout the species range, although significant declines have occurred in the most recent survey years. Western populations taken as a whole display a slight declining trend. Nesting productivity often varies in concert with outbreaks of caterpillars, cicadas, and other large insects.

**FURTHER READING:** Sealy 1978, 1985.



# FLAMMULATED OWL

*Otus flammeolus*

Strigidae

Summer Resident

WINTERING AREA: 3

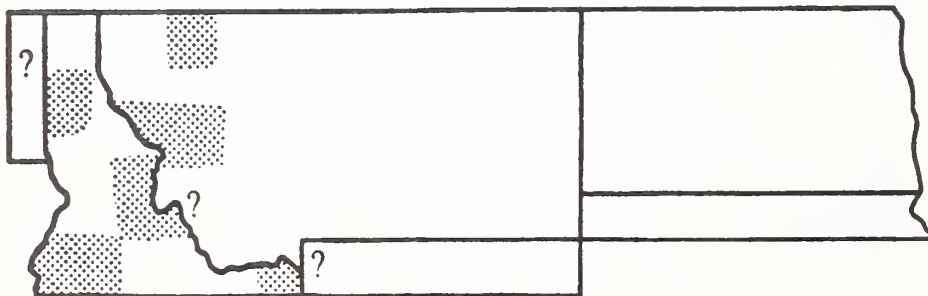
**HABITAT REQUIREMENTS:** Mature ponderosa pine forest, mixed ponderosa pine-Douglas fir forest, perhaps other montane coniferous forests to a lesser extent. Nests in woodpecker-excavated (sometimes natural) cavity in pine, occasionally aspen, and perhaps, larch.

**FEEDING:** Nearly exclusively invertebrates: insects, scorpions, spiders, and centipedes, only rarely taking small mammals, birds, or other small vertebrate prey. Captures flying insects in flight and gleans other prey from branches, trunks, and foliage of trees.

**STATUS AND MANAGEMENT:** Rather inconspicuous, Flammulated Owls do not appear in the regional BBS database, but may be more widespread in the western portion of the region than is currently known (Holt and Hillis, 1987). Flammulated Owls

appear only rarely on BBS routes anywhere within their range, but the few data that exist indicate a significant decline. Closely associated with extensive stands of old-growth ponderosa pine and mixed old-growth ponderosa pine-Douglas fir (Mannan and Meslow, 1984), the species has disappeared from portions of its previous breeding range where such habitats have been highly fragmented and much diminished in extent. Flammulated Owls avoid cutover areas and forests younger than 100 years old (Reynolds and Linkhart, 1987b). Strictly nocturnal. Will use nest boxes.

**FURTHER READING:** Balda et al., 1975; Bergman, 1983; Goggans, 1985; Howie and Ritcey, 1987; Johnsgard, 1988; Linkhart and Reynolds, 1987; McCallum and Gehlbach, 1988; Reynolds and Linkhart 1987a.



# BURROWING OWL

*Speotyto cunicularia*  
Strigidae

Summer Resident

WINTERING AREA: 4

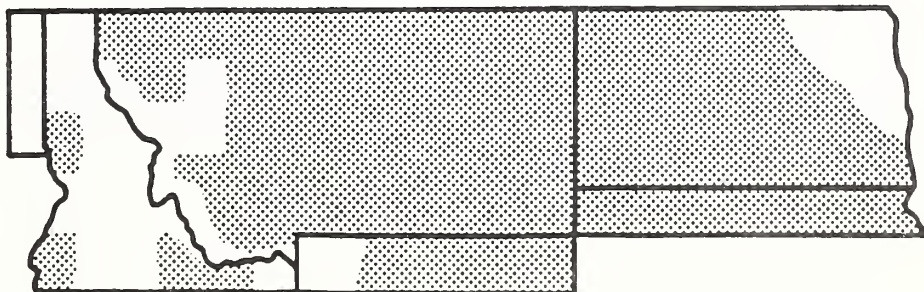
**HABITAT REQUIREMENTS:** Prairie, grassland, meadow, open shrub steppe, but does not use structurally-similar montane habitats. Nests in abandoned mammal (usually ground squirrel or prairie dog) burrow. Also known to use habitat provided by airports and golf courses if relatively free of human disturbance.

**FEEDING:** Largely insectivorous but also frequently takes small mammals, which not uncommonly comprise majority of diet; also takes birds and other small vertebrates. Hunts from elevated perch or from low, patrolling flight, often hovering briefly before dropping onto prey; also stalks invertebrate prey on the ground. Often forages in the daytime.

**STATUS AND MANAGEMENT:** Numbers are small but relatively stable in Idaho and North Dakota, although populations continue to exhibit longterm declines in Montana. Elsewhere, numbers continue to decline steadily throughout the species range, although the data are equivocal in some parts of the

West. Listed as a Threatened species in Canada. As a consequence of control measures that have reduced populations of colonial rodents and as prairie and plains habitats have been converted to agriculture, Burrowing Owls have been reduced greatly, as well. Favors well-grazed, early successional grasslands (typified by conditions found in prairie dog colonies) with soils having significant sand content (MacCracken et al., 1985). Management recommendations include maintenance of pesticide- and herbicide-free areas of 600 m radius around nest burrows and provision of uncultivated plots supporting dense herbaceous vegetation within owl home ranges to supply habitat for rodent and insect prey (Haug and Oliphant, 1990). Burrowing Owls will use artificial nest burrows (Collins and Landry, 1977).

**FURTHER READING:** Green and Anthony, 1989; Johnsgard, 1988; Konrad and Gilmer, 1984; Marti, 1974; Rich, 1986.





# LONG-EARED OWL

*Asio otus*

Strigidae

Summer Resident but occasionally Permanent Resident in most of region (less commonly than Short-eared Owl)

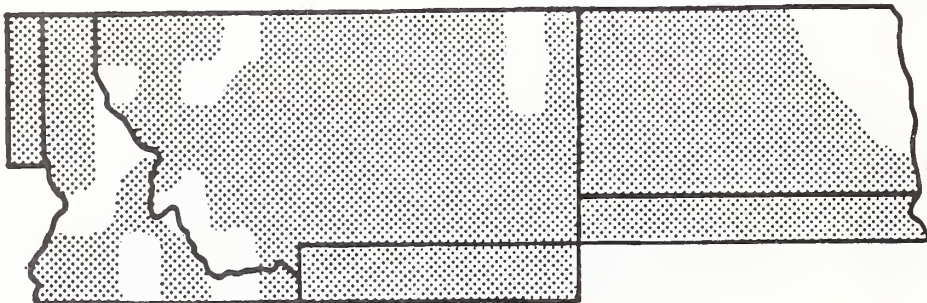
WINTERING AREA: 5

**HABITAT REQUIREMENTS:** Coniferous or mixed forest, also frequently in aspen parkland or mixed woodland, dense thickets of small trees near open habitats, orchards, riparian woodland, and isolated woodlots; often near water. Nests in abandoned corvid or hawk nest or in mistletoe broom in trees.

**FEEDING:** A specialist on small mammals, primarily rodents (especially voles or, in some regions, pocket gophers or heteromyid rodents), only occasionally taking small birds, and rarely feeding on other small vertebrates or large insects. Drops onto prey from a low, searching flight, often systematically quartering over fields like a Short-eared Owl. Hunts primarily at night.

**STATUS AND MANAGEMENT:** Long-eared Owls are virtually absent from BBS surveys. Highly nomadic, local numbers fluctuate markedly in concert with abundance of primary rodent prey (especially responsive to vole cycles). Loss of riparian habitats in the West are likely to have resulted in decreased numbers in the region (Johnsgard, 1988). In northeastern Oregon, Long-eared Owls nest in extensive, dense, unlogged conifer forests and are dependent on dwarf-mistletoe brooms in Douglas-fir for nest sites (Bull et al., 1989). In winter, often roosts communally in dense conifers or other suitable dense trees or shrubs, with favored sites used perennially.

**FURTHER READING:** Bosakowski et al., 1989; Craig et al., 1988; Marks, 1986; Marti, 1976.



# SHORT-EARED OWL

*Asio flammeus*  
Strigidae

Permanent Resident in most of region but largely a  
Summer Resident in North Dakota

WINTERING AREA: 5

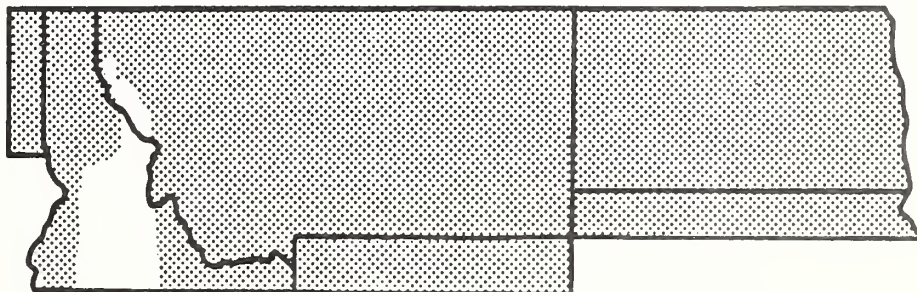
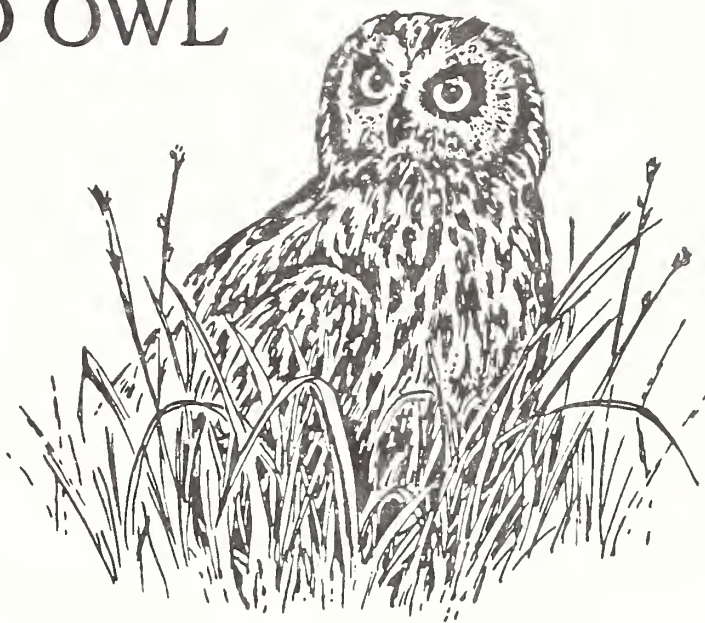
**HABITAT REQUIREMENTS:** Prairies, grasslands, meadows, marshes, sparse shrubsteppe; more likely also to use grain stubblefields, hay meadows, and pastures in winter. Nests on the ground in dense cover.

**FEEDING:** Almost exclusively rodents, especially voles, but also other small mammals and occasional birds and large insects. Forages in a prolonged, low, searching flight, often hovering briefly before dropping onto prey, or glides down onto prey from slightly elevated perch. Often seen hunting in the daytime.

**STATUS AND MANAGEMENT:** The nomadic behavior of Short-eared Owls creates difficulty for accurate assessments of its numbers. BBS data

indicate only slight declines in Idaho and Montana and relative stability of low numbers in North Dakota, where it has declined markedly since the 1930's. The species appears too infrequently to project population trends for its entire range but the species has declined significantly in the West as favored marsh habitats have been destroyed and native prairies have been overgrazed or converted to agriculture. Irruptive and nomadic, Short-eared Owls seek out areas with high rodent densities for breeding. Roosts singly or communally on the ground at all times of year, but switches to dense conifers for roosting in winter when snow precludes ground roosting..

**FURTHER READING:** Bosakowski, 1986; Clark, 1975; Holt et al., 1992; Johnsgard, 1988.



# COMMON NIGHTHAWK

*Chordeiles minor*  
Caprimulgidae

Summer Resident

WINTERING AREA: 1

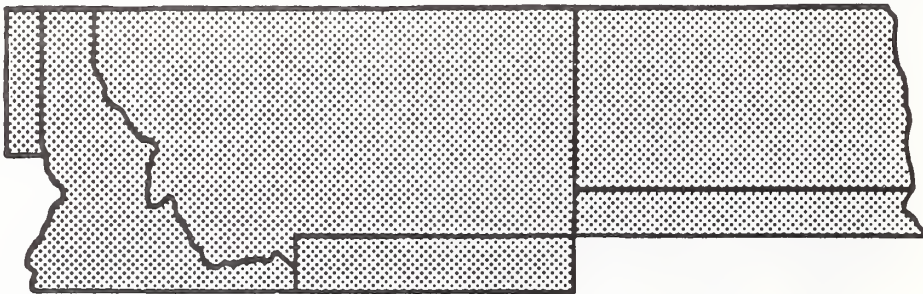
**HABITAT REQUIREMENTS:** Open and partially-open habitats: prairie, grassland, meadows, shrub steppe, open woodland, agricultural fields, towns. Usually nests on the ground, occasionally on flat, graveled roof, and rarely on low stump or old passerine cup nest.

**FEEDING:** Forages aerially in continuous flight for a diet comprised exclusively of flying insects. This is the only caprimulgid in North America that commonly forages in the daytime, although it is largely crepuscular (i.e., active at dawn and at dusk).

**STATUS AND MANAGEMENT:** Numbers have improved significantly in North Dakota and appear to

be increasing slightly in Idaho but decreasing somewhat in Montana. For the species as a whole in North America, populations appear to be stable overall, although there have been areas of marked decreases in the most recent survey years, including the Dakotas, Wyoming, and Colorado, and a trend toward decreasing numbers in the West generally. Although flat-topped roofs are used both as roost sites and as nest sites, nighthawks strongly prefer natural sites. at least in some parts of their range (Brigham, 1989).

**FURTHER READING:** Aldridge and Brigham, 1991; Brigham, 1990.





# COMMON POORWILL

*Phalaenoptilus nuttallii*  
Caprimulgidae

Summer Resident

WINTERING AREA: 5

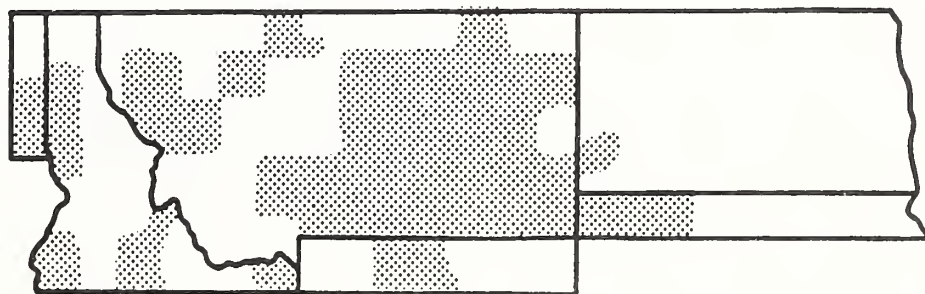
**HABITAT REQUIREMENTS:** Arid or semi-arid open, rocky habitats: prairie, badlands, canyons, open woodland, shrubsteppe, occasionally breeding in suitable montane habitat but only at lower elevations. Nests on the ground.

**FEEDING:** Forages in the air within a few meters of the ground by sallying from the ground to capture flying insects.

**STATUS AND MANAGEMENT:** Although distributed widely in the region, appears in BBS data only

for Idaho, where it seems to be declining (but sample sizes are exceedingly small). BBS data are insufficient to assess overall trends from the species range as a whole, but what few data there are indicate relative stability. Strictly nocturnal, foraging mostly at dusk and at dawn (i.e., a “crepuscular” forager), and relatively little known ecologically.

**FURTHER READING:** Brigham and Barclay, 1992.



# CHIMNEY SWIFT

*Chaetura pelagica*  
Apodidae

Summer Resident

WINTERING AREA: 1

**HABITAT REQUIREMENTS:** Woodland and other open areas, especially near human dwellings, most often nesting in chimneys or other similarly shaped, human-built structure. Presumably nested in hollow trees prior to the advent of European humanity on the continent.

**FEEDING:** Dines on the wing, feeding exclusively on flying insects.

**STATUS AND MANAGEMENT:** Numbers are small but increasing significantly in North Dakota. Over-

all, populations appear to be declining in many areas, markedly so in the most recent survey years. Provision of suitable nesting and roosting sites in the form of chimneys likely has been responsible for a pronounced westward range extension by Chimney Swifts. Breeds in small colonies of a few pairs but gathers into enormous post-breeding flocks that roost together in suitable sites prior to migration.

**FURTHER READING:** Dexter, 1981; Zammuto et al., 1981.



# VAUX'S SWIFT

*Chaetura vauxi*

Apodidae

Summer Resident

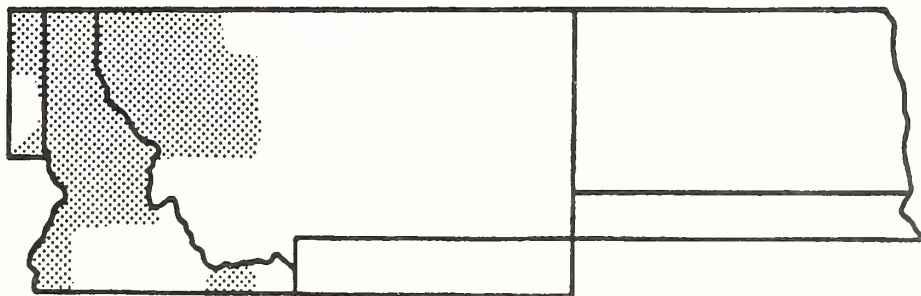
WINTERING AREA: 3

**HABITAT REQUIREMENTS:** Coniferous forests, especially old-growth, but will nest in snags found in burned or logged forest, although these areas appear to be much less preferred. Nests in woodpecker-excavated cavity in heartwood fungus-infected live conifer (especially in cavities created by Pileated Woodpeckers in old-growth conifers) or in hollow coniferous snag; only seldom uses abandoned chimney for nest site. Reportedly nests in broken-top snags of older cottonwoods in western Montana cottonwood stands.

**FEEDING:** Forages aerially on a diet comprised exclusively of flying insects.

**STATUS AND MANAGEMENT:** Appears infrequently in BBS database but numbers appear to be declining somewhat in both Idaho and Montana, as well as in the West as a whole. Vaux's Swifts appear to depend heavily on Pileated Woodpeckers for provision of suitable nest sites in old-growth coniferous forests (Bull and Cooper, 1991). Closely associated with old-growth Douglas-fir/ponderosa pine forests providing large-diameter, broken-top snags (Mannan and Meslow, 1984). Roost sites are used communally from time of arrival on the breeding grounds until departure on autumn migration; suitable roost site is a large diameter, hollowed snag or stub of old-growth conifer (Bull, 1991).

**FURTHER READING:** Baldwin and Hunter, 1963; Baldwin and Zaczkowski, 1963.





# BLACK SWIFT

*Cypseloides niger*  
Apodidae

Summer Resident

WINTERING AREA: 3

**HABITAT REQUIREMENTS:** Montane areas, associated with steep cliffs or canyons, especially near water. Nests in high rock crevice or shallow cave, not uncommonly behind a waterfall.

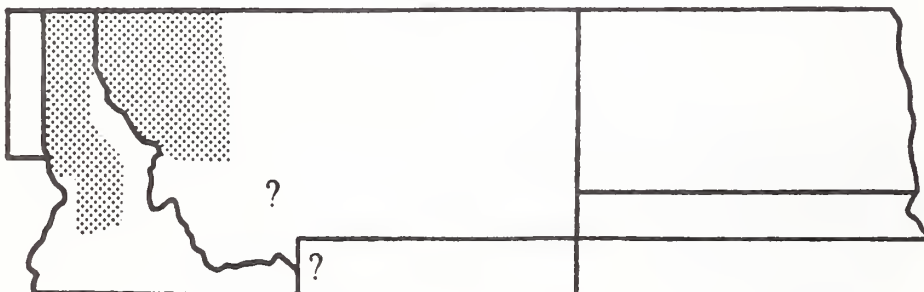
**FEEDING:** Feeds on the wing, dining exclusively on flying insects. Generally forages high in the air but will often fly low over rivers and streams in pursuit of emerging aquatic insects.

**STATUS AND MANAGEMENT:** Black Swifts have been detected on two BBS routes in Idaho and on two



routes in Montana, but are much too uncommon in the BBS database to project trends either regionally or over their North American range as a whole. Nests in small colonies of a few pairs. Nest sites may be reused for many years. One of the least known and elusive species of North American landbirds.

**FURTHER READING:** Hunter and Baldwin, 1962; Knorr, 1961; Kondla, 1973.



# WHITE-THROATED SWIFT

*Aeronautes saxatalis*

Apodidae

Summer Resident

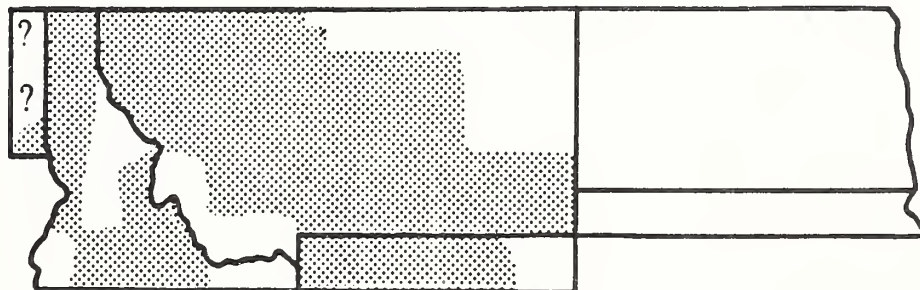
WINTERING AREA: 4

**HABITAT REQUIREMENTS:** Montane areas, nesting in rock crevices of sheer cliffs and canyon walls. Occasionally nests in tall, human-built structures, such as bell towers and grain elevators.

**FEEDING:** Feeds in flight, exclusively on flying insects. Generally forages high in the air over canyons or cliffs but will fly low over rivers and streams in pursuit of emerging aquatic insects.

**STATUS AND MANAGEMENT:** BBS data for the region are insufficient to make any assessment of trends, but in the West overall there has been a small but significant decline in numbers. Traditional use of nest and roost sites over many years (Dobkin et al., 1986). Post-breeding flocks roost communally prior to migration.

**FURTHER READING:** Collins, 1983



# RUBY-THROATED HUMMINGBIRD

*Archilochus colubris*  
Trochilidae

Summer Resident

WINTERING AREA: 4

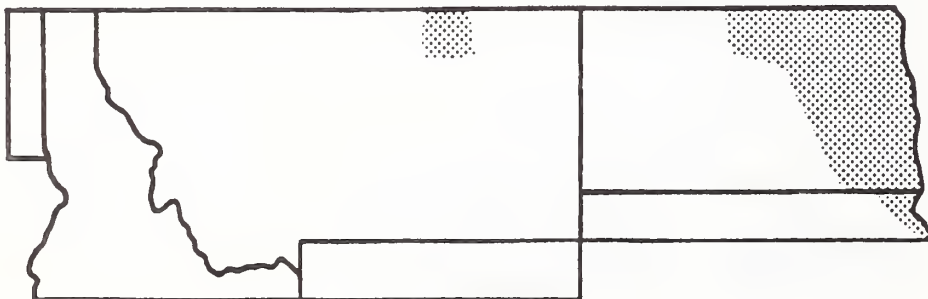
**HABITAT REQUIREMENTS:** Brushy margins and openings in deciduous forest in mountains and on floodplains. Nests in trees near or over water, occasionally reusing nests in subsequent years.

**FEEDING:** Hovers to take floral nectar and glean insects and spiders from vegetation, but also relies at times on tree sap from sapsucker wells.

**STATUS AND MANAGEMENT:** Does not appear in the region's BBS database; North Dakota and north-

eastern Montana form the western edge of the Ruby-throated Hummingbird's breeding range in the U.S. Numbers have declined steadily throughout North America, which has been attributed to problems encountered on the tropical wintering grounds.

**FURTHER READING:** Johnsgard, 1983; Miller and Nero, 1983; Mulvihill et al., 1992; Willimont et al., 1988.





# BLACK-CHINNED HUMMINGBIRD

*Archilochus alexandri*  
Trochilidae

Summer Resident

WINTERING AREA: 2

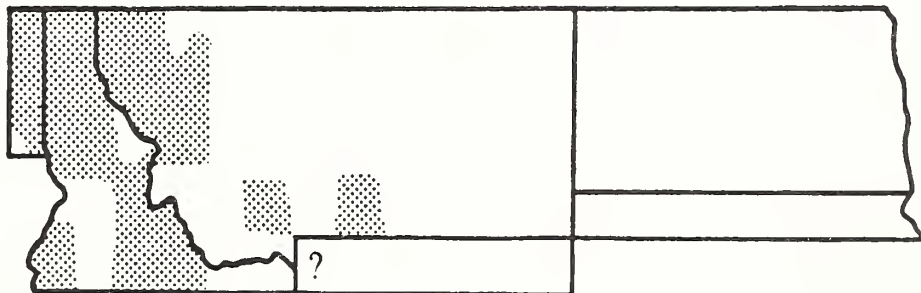
**HABITAT REQUIREMENTS:** Riparian woodland and open woodland near water in lower mountains, also montane meadows in migration. Generally nests in trees, usually near or over water.

**FEEDING:** Hovers to take floral nectar and glean insects and spiders from vegetation.

**STATUS AND MANAGEMENT:** Not very common in the region as reflected by the absence of BBS data.

Over its entire range, numbers appear to be stable. Ecologically not well known in the region which is the northern and eastern limit of the breeding range.

**FURTHER READING:** Baltosser, 1989; Ewald, 1985; Johnsgard, 1983; Stromberg and Johnsen, 1990.



# CALLIOPE HUMMINGBIRD

*Stellula calliope*  
Trochilidae

Summer Resident

WINTERING AREA: 2

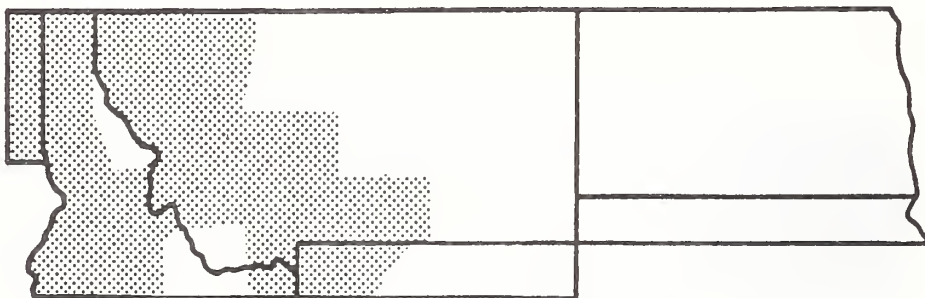


**HABITAT REQUIREMENTS:** Open montane forests, meadows, burned areas, and riparian thickets, also alpine tundra following breeding and in migration. Nests in trees, often building on old nests in successive years.

**FEEDING:** Hovers to take floral nectar and glean insects and spiders from vegetation.

**STATUS AND MANAGEMENT:** Numbers suggest stability of populations in the region, although sample sizes are very small. Overall, populations appear stable although numbers have decreased significantly in British Columbia in the most recent survey years.

**FURTHER READING:** Tamm et al., 1989; Tyrell and Tyrell, 1984.



# BROAD-TAILED HUMMINGBIRD

*Selasphorus platycercus*  
Trochilidae

Summer Resident

WINTERING AREA: 3

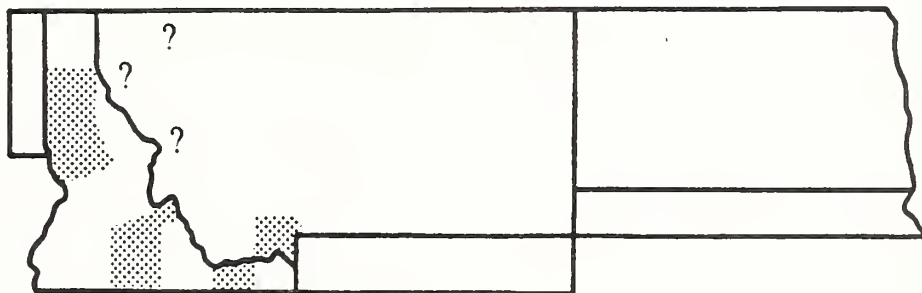
**HABITAT REQUIREMENTS:** Open woodland, brushy slopes, riparian and montane thickets, also other open habitats in migration. Generally nests in trees, often over or near mountain streams.

**FEEDING:** Hovers to take floral nectar and glean insects and spiders from vegetation.

**STATUS AND MANAGEMENT:** Numbers are too small for the region to give any indication of status,

but appear relatively stable for the species range as a whole. The northern edge of the Broad-tailed Hummingbird's breeding range extends to the westernmost portion of the region.

**FURTHER READING:** Calder et al., 1983; Inouye et al., 1991; Johnsgard, 1983; Miller and Inouye, 1983; Waser, 1976.





# RUFOUS HUMMINGBIRD

*Selasphorus rufus*  
Trochilidae

Summer Resident

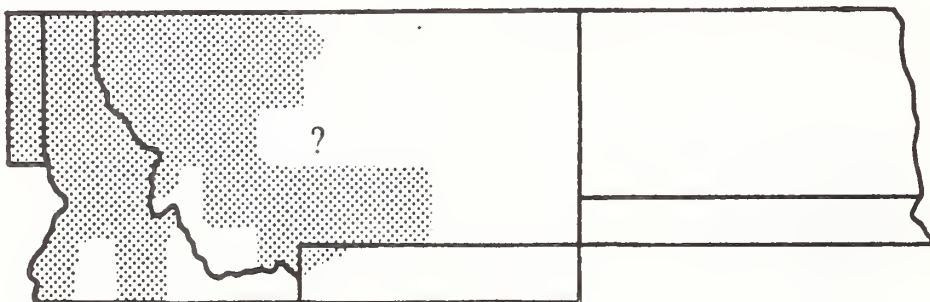
WINTERING AREA: 2

**HABITAT REQUIREMENTS:** Open, montane coniferous forests, woodland edges and thickets; in migration, nearly any open habitat providing abundant flowers for foraging. Nests usually in conifers but also uses deciduous trees or vine tangles; nests are often refurbished and reused in succeeding years.

**FEEDING:** Hovers to take floral nectar and glean insects and spiders from vegetation.

**STATUS AND MANAGEMENT:** BBS data are too sparse for the region to determine status, but numbers appear to be declining significantly in the West.

**FURTHER READING:** Calder and Jones, 1989; Carpenter and Hixon, 1988; Gass, 1979; Hiebert, 1991; Johnsgard, 1983; Paton and Carpenter, 1984; Tyrell and Tyrell, 1984.



# BELTED KINGFISHER

*Ceryle alcyon*

Alcedinidae

Primarily a Summer Resident but not uncommonly a Permanent Resident from central and southern Montana westward in the region

WINTERING AREA: 4

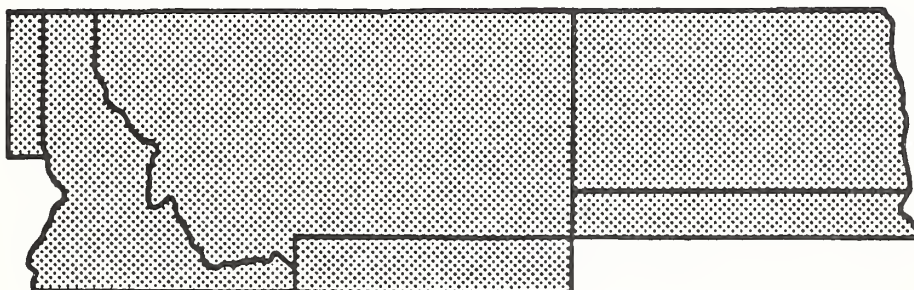
**HABITAT REQUIREMENTS:** From lowlands to montane parks, always associated closely with water, especially wooded streams and rivers, but also lakes, ponds, and any other permanent body of water providing fish. Nests in horizontal burrow excavated in vertical bank along streams and rivers. Prefers nest sites in soils with high sand and low clay composition. Usually excavate their own burrow or sometimes modify an abandoned mammal burrow; also known to rarely nest in cavity of a snag.

**FEEDING:** Diet is comprised largely of small fish but also takes a wide variety of aquatic invertebrates, as well as occasional small vertebrates.

Captures aquatic prey by diving into water from a perch or after hovering briefly while in flight; prey are captured with the beak.

**STATUS AND MANAGEMENT:** Populations in the region appear to be stable except in Idaho where there has been a small but significant continuing decline. Slight declines are indicated for Western populations as a whole, as well as for the species generally across the continent, although the picture is rather mixed.

**FURTHER READING:** Brooks and Davis, 1987; Davis, 1982, 1986.



# LEWIS' WOODPECKER

*Melanerpes lewis*

Picidae

Summer Resident, only rarely a Permanent Resident  
in western and southern Montana

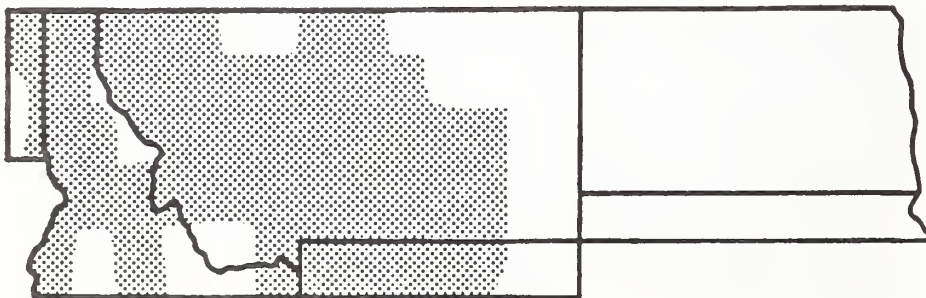
WINTERING AREA: 5

**HABITAT REQUIREMENTS:** Open forest and woodland, primarily of ponderosa pine, including logged or burned areas with abundant snags, as well as riparian woodland (especially cottonwood groves). Nests in cavity of a dead limb on live tree or in standing snag, frequently used perennially.

**FEEDING:** Mainly insects caught flycatcher-like by sallying from a perch and capturing insects in flight, but also gleans food from the ground and from tree bark. Diet (especially in late summer and autumn) includes nuts, berries, pine seeds, fruit; caches acorns and nuts in natural bark crevices. Lewis' Woodpeckers rarely drill into bark to excavate insects like typical woodpeckers.

**STATUS AND MANAGEMENT:** An increasingly uncommon species in the region, as reflected by relatively infrequent encounters on the BBS routes; declining significantly in Montana and apparently declining in Idaho, as in the West generally. Logged or burned areas with standing snags provide suitable habitat only if a shrub understory is present. Populations using riparian woodlands in arid and semi-arid areas have declined precipitously in apparent response to loss and degradation of these riparian habitats by livestock; competition with European Starlings for suitable nest cavities may also be a factor.

**FURTHER READING:** Bock, 1970; Sousa, 1983.



# YELLOW-BELLIED SAPSUCKER

*Sphyrapicus varius*

Picidae

Summer Resident

WINTERING AREA: 4

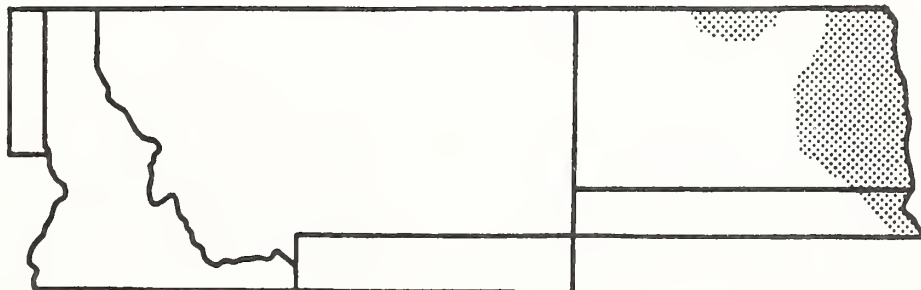
**HABITAT REQUIREMENTS:** Extensive tracts of deciduous forests (especially riparian) in uplands (aspen, birch, poplar, ash) and lowlands (elm, ash, basswood, hackberry). Excavates cavity for nest in live deciduous tree, favoring trees infected with heart-rot fungus (*Fomes*); does not reuse nest cavities but may excavate new cavity in favored tree in successive years.

**FEEDING:** Primarily feeds on insects, captured by bark gleaning and by drilling into trees; also consumes sap phloem tissue from deciduous trees (from conifers in early spring), and occasionally fruits and berries. Yellow-bellied Sapsuckers also infrequently

will sally from perch to hawk insects in a flycatcher-like fashion.

**STATUS AND MANAGEMENT:** North-central and eastern North Dakota form the western edge of the Yellow-bellied Sapsucker's breeding range in the U.S. Data are insufficient from the region to assess status but the species is declining significantly within its range as a whole, especially in the north-central portion of its distribution.

**FURTHER READING:** Kilham, 1971; Lawrence, 1967; Tate, 1973.





# RED-NAPED SAPSUCKER

*Sphyrapicus nuchalis*

Picidae

Summer Resident

WINTERING AREA: 4

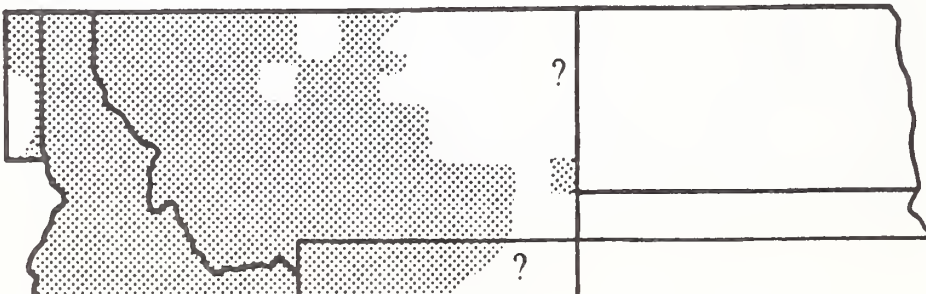
**HABITAT REQUIREMENTS:** Mature coniferous forest with aspen and montane riparian woodland, but most strongly associated with mature aspen (especially riparian) woodland. Excavates cavity for nest in live or dead deciduous tree (including larch, but only rarely in other coniferous trees), favoring aspens infected with heart-rot fungus (*Fomes*); does not reuse nest cavities but may excavate new cavity in favored tree in successive years.

**FEEDING:** Primarily feeds on insects, captured by bark gleaning and by drilling into trees; also consumes sap and pitch, occasionally fruits and berries. Relies heavily on sap from conifers as food source upon arrival in spring; sap of aspen and birch used only after buds open on the trees. Red-naped Sapsuckers also sally from perch to hawk insects in a flycatcher-like fashion.

**STATUS AND MANAGEMENT:** BBS data are confounded by the recent division of the Yellow-bellied Sapsucker into two species, with the western populations now known as the Red-naped Sapsucker. Populations appear to be stable but the heavy depen-

dence of this species on mature riparian woodland in the more arid parts of its range may be cause for concern, as these habitats have been impacted heavily by livestock in many areas. In montane riparian habitats where it is the most abundant woodpecker, Red-naped Sapsuckers often function as "keystone" species by providing nest cavities for secondary cavity-nesting species (Dobkin and Wilcox, 1986). In the central Rockies, reduction of uncut aspen stands and conifer invasion of aspen woodland are likely to negatively impact sapsucker populations (Finch and Reynolds, 1988). In the northern Rockies, relative abundance and fledging success in small (<16 ha) logged units that retain snags and live deciduous trees do not differ from adjacent large tracts of unlogged forest (Tobalske, 1992).

**FURTHER READING:** Crockett and Hadow, 1975; Johnson and Zink, 1983; Mannan and Meslow, 1984.



# WILLIAMSON'S SAPSUCKER

*Sphyrapicus thyroideus*  
Picidae

Summer Resident

WINTERING AREA: 5

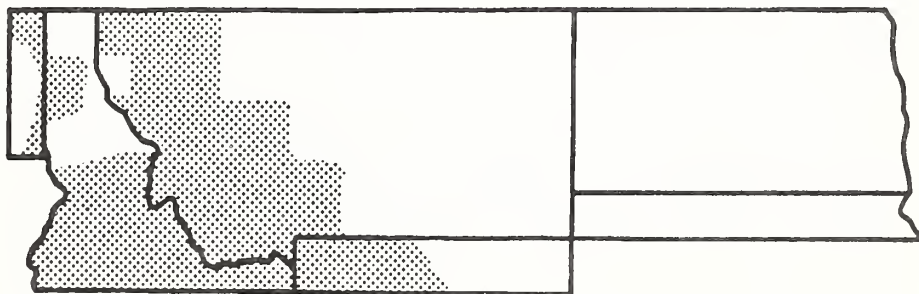
**HABITAT REQUIREMENTS:** Montane coniferous forest, especially Douglas-fir, ponderosa pine, and lodgepole pine, but also aspen woodland. Excavates cavity for nest in pine, aspen, fir, or larch; does not reuse nest cavities but may excavate new cavity in favored tree in successive years.

**FEEDING:** Primarily feeds on insects, especially ants, by drilling into trees; also consumes sap.

**STATUS AND MANAGEMENT:** Uncommon in the region and rarely encountered on the BBS routes.

but what few data exist point to a significant decrease in numbers in Montana, the only state with data for the region. In the West as a whole, however, numbers appear to be increasing. Apparently an area-sensitive species, Williamson's Sapsucker is generally associated with old-growth forests (Mannan and Meslow, 1984; Moore, 1992) and is not found in smaller fragments (Aney, 1984).

**FURTHER READING:** Bock and Larson, 1986; Crockett and Hansley, 1977.



# OLIVE-SIDED FLYCATCHER

*Contopus borealis*

Tyrannidae

Summer Resident

WINTERING AREA: 1

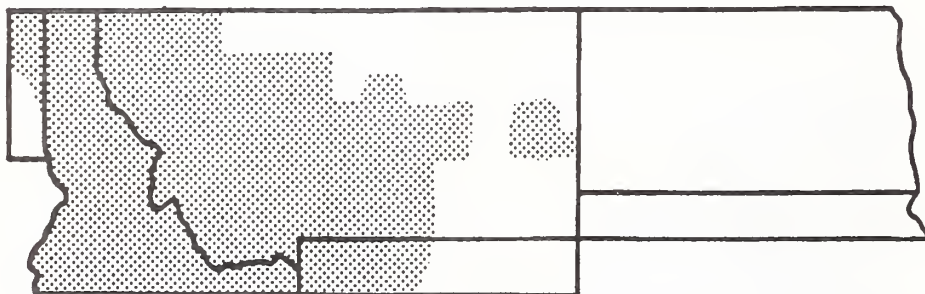
**HABITAT REQUIREMENTS:** Montane coniferous forest and woodland, especially burned areas with abundant standing snags, also riparian woodland. Usually nests in conifers.

**FEEDING:** Diet is composed exclusively of flying insects that are captured with sallies from exposed perches high in the tops of conifers.

**STATUS AND MANAGEMENT:** Numbers appear small but stable within the region, with a slight

decline indicated in North Dakota where it is at the edge of its breeding range and only infrequently encountered. In the West as a whole, however, Olive-sided Flycatchers have decreased significantly, as is also the case for its North American range in general. Loss of wintering habitat in Central America has been implicated as an important contributor to the flycatcher's widespread decline.

**FURTHER READING:** Finch and Reynolds, 1988; Marshall, 1988.



# WESTERN WOOD-PEWEE

*Contopus sordidulus*

Tyrannidae

Summer Resident

WINTERING AREA: 1

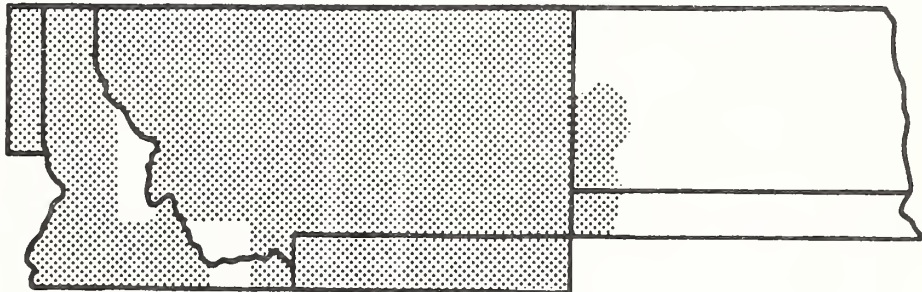
**HABITAT REQUIREMENTS:** Coniferous and mixed coniferous-deciduous forest, woodland (especially riparian), and forest edge. Favors open forests dominated by conifers. Nests in conifer trees.

**FEEDING:** Sallies from exposed perch to capture insects in flight, then returns to perch, or hovers to glean insects or berries from vegetation.

**STATUS AND MANAGEMENT:** Numbers appear to be declining somewhat in Idaho but increasing

significantly in Montana. The overall picture in the West is one of relative stability with perhaps a slight declining trend, although numbers have increased significantly in the most recent survey years. The foregoing picture stands in marked contrast to that of the very closely related and ecologically similar Eastern Wood-Pewee.

**FURTHER READING:** Beaver and Baldwin, 1975; Eckhardt, 1976; Hejl et al., 1988; Verbeek 1975a, b.





# EASTERN WOOD-PEWEE

*Contopus virens*  
Tyrannidae

Summer Resident

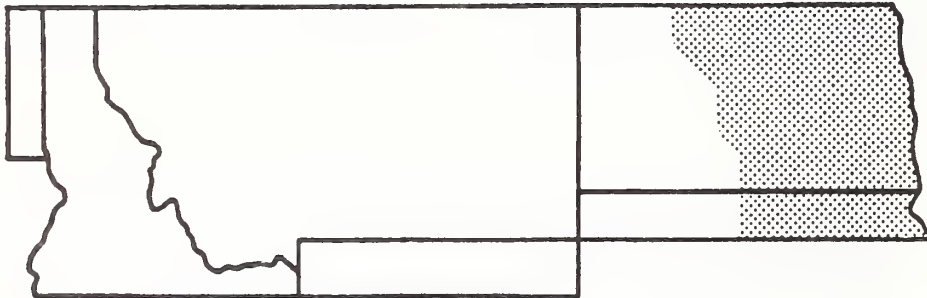
WINTERING AREA: 1

**HABITAT REQUIREMENTS:** Deciduous forest on floodplains and river bluffs along major watercourses and in extensive tracts of upland deciduous forest. Nests in deciduous trees.

**FEEDING:** Sallies from exposed perch to capture insects in flight, then returns to perch, or hovers to glean insects or berries from vegetation.

**STATUS AND MANAGEMENT:** No BBS data exist for Eastern Wood-Pewees in the region, but populations have decreased quite significantly across the species' North American range, especially in recent survey years.

**FURTHER READING:** Ehrlich et. al., 1988.



# LEAST FLYCATCHER

*Empidonax minimus*

Tyrannidae

Summer Resident

WINTERING AREA: 3

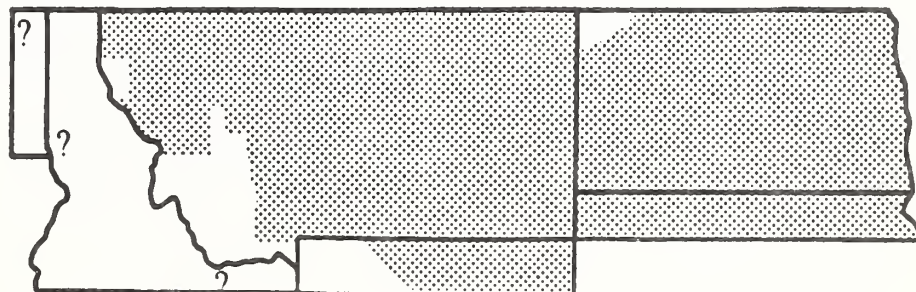
**HABITAT REQUIREMENTS:** Open woodland and shrubland in mountains and lowlands, usually deciduous, especially floodplain forests in eastern portion of region, shelterbelts, parks, orchards. Nests usually in deciduous, sometimes coniferous, tree or shrub.

**FEEDING:** Feeds primarily by hovering to glean insects from vegetation and, less frequently, sallies from exposed perch to capture insects in flight, then returns to perch. Also hovers to glean berries from vegetation and occasionally includes a few seeds in diet.

**STATUS AND MANAGEMENT:** Numbers appear stable in North Dakota and significantly increasing in Montana. Least Flycatchers are found primarily

to the east and north of the region, and are declining on a continent-wide basis, markedly so in recent survey years. In contrast to the overall pattern, U.S. populations west of the Mississippi River appear to be increasing significantly. Least Flycatchers are sensitive to forest disturbances and respond either by 1) decreasing density of breeding birds in direct proportion to the intensity of logging operations (e.g., Freedman et al., 1981), or 2) shifting further into forest interior, retreating farther with increasing size of the disturbed area. (Della Sala and Rabe, 1987).

**FURTHER READING:** Briskie and Sealy, 1989; Darveau et al., 1992; Sherry and Holmes, 1988.



# HAMMOND'S FLYCATCHER

*Empidonax hammondii*  
Tyrannidae

Summer Resident

WINTERING AREA: 4

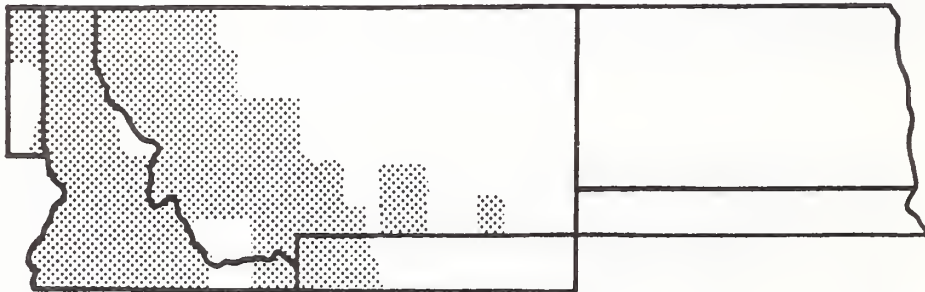
**HABITAT REQUIREMENTS:** Montane coniferous forest and woodland, favoring dense stands of fir or Douglas-fir, also aspen and other deciduous, riparian woodland. Nests generally in live coniferous tree, occasionally in aspen or other deciduous tree.

**FEEDING:** Sallies from exposed, generally high, perch to capture insects in flight, then returns to perch. Diet comprised exclusively of insects.

**STATUS AND MANAGEMENT:** Apparently declining in both Idaho and Montana but stable elsewhere in its range, although BBS data appear to

fluctuate quite a bit. Hammond's Flycatchers are nesting-habitat specialists that strongly favor intact stands of old-growth (>200 years) and mature (99-199 years) coniferous forest, and are adversely affected by conversion of old-growth forests to younger-aged classes (Sakai and Noon, 1991). Although found in other age-classes of forest, the species is consistently more abundant in old growth (Hejl and Woods, 1991; Mannan and Meslow, 1984; Moore, 1992).

**FURTHER READING:** Beaver and Baldwin, 1975; Johnson and Marten, 1991; Manuwal, 1970.



# DUSKY FLYCATCHER

*Empidonax oberholseri*

Tyrannidae

Summer Resident

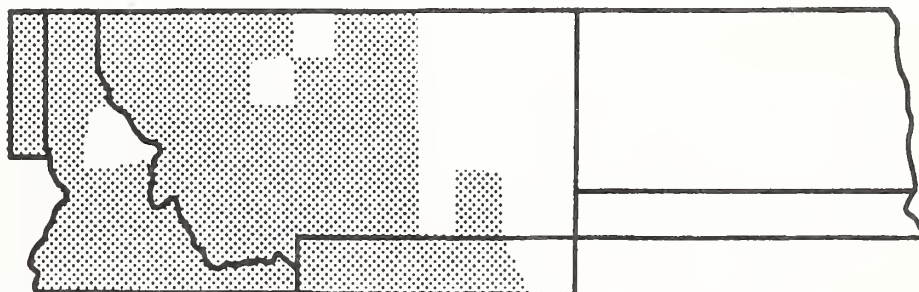
WINTERING AREA: 5

**HABITAT REQUIREMENTS:** Wide range of open woodland and shrub habitats: ponderosa pine or other conifers, mountain mahogany, aspen, riparian woodland, montane shrubsteppe. Nests most frequently in shrub, but also in low trees.

**FEEDING:** Sallies from exposed perch to capture insects in flight, then returns to perch, or hovers to glean insects from vegetation. Diet comprised exclusively of insects.

**STATUS AND MANAGEMENT:** Numbers have increased significantly in Montana and appear stable in Idaho. Overall pattern throughout the range is one of stability with a trend toward marked increases in the most recent survey years. Consistently more abundant in managed coniferous forest stands than in old growth (e.g., Hejl and Woods, 1991; Mannan and Meslow, 1984). Often found on brushy, cutover slopes.

**FURTHER READING:** Johnson, 1966; Morton and Pereyra, 1985.





# WILLOW FLYCATCHER

*Empidonax traillii*  
Tyrannidae

Summer Resident

WINTERING AREA: 3

**HABITAT REQUIREMENTS:** Found at all elevations in dense willow thickets and other low, dense, riparian woodland, open woodland margins, and scattered shrub thickets or groves of trees (especially shelterbelts) within prairies. Nests in shrubs or low deciduous trees.

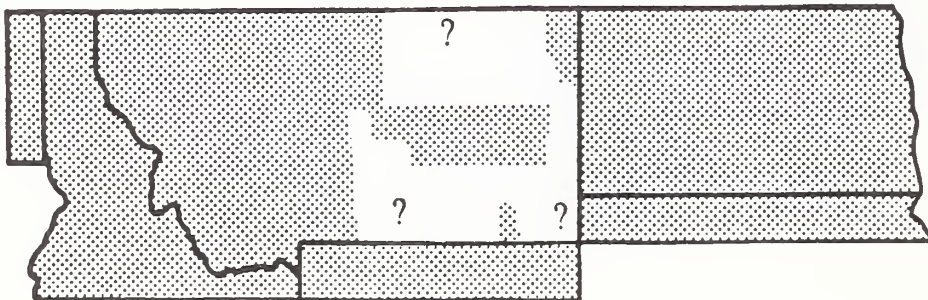
**FEEDING:** Sallies from exposed perch to capture insects in flight, then returns to perch, or hovers to glean insects or berries from vegetation and may occasionally include a few seeds in diet.

**STATUS AND MANAGEMENT:** Numbers appear stable in Idaho and increasing significantly in Montana and North Dakota. Numbers now appear to be increasing significantly for the species' range as a whole, with the exception of the southwest and parts of the midwest. Western populations had



experienced a precipitous decline in recent years with southwestern populations approaching extinction. The southwestern population is listed as a candidate for Threatened or Endangered status at the federal level. Frequent cowbird host. Declines in the west have been attributed to a combination of riparian habitat degradation by livestock and heavy parasitism by cowbirds; may also be threatened by deforestation on the wintering grounds in the tropics. Populations increase in response to reduction of cattle grazing and cessation of willow control in riparian habitats (Taylor and Littlefield, 1986).

**FURTHER READING:** Barlow and McGillivray, 1983; Frakes and Johnson, 1982; Sanders and Flett, 1989; Sedgwick and Knopf, 1989.



# CORDILLERAN FLYCATCHER

*Empidonax occidentalis*  
Tyrannidae

Summer Resident

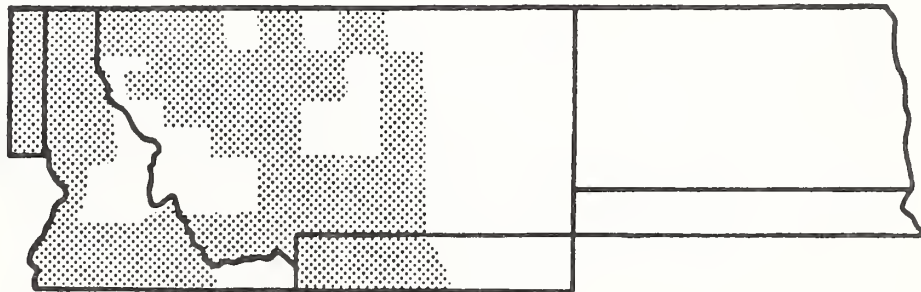
WINTERING AREA: 2

**HABITAT REQUIREMENTS:** Found mainly in association with streams in montane coniferous forest, dense second-growth, aspen, and riparian woodlands, especially in canyons. Often nests along streams, usually in cavity of small tree or on cliff ledge, also on human-built structures and on or near the ground among tangled tree roots.

**FEEDING:** Sallies from exposed perch to capture insects in flight, then returns to perch, or hovers to glean insects or berries from vegetation and may occasionally include a few seeds in diet.

**STATUS AND MANAGEMENT:** Populations in Idaho have declined sharply and Montana numbers show a slight downward trend, as well. For the Cordilleran Flycatcher's range taken as a whole, numbers appear to be relatively stable.

**FURTHER READING:** Beaver and Baldwin, 1975; Johnson, 1980.



# EASTERN PHOEBE

*Sayornis phoebe*  
Tyrannidae

Summer Resident

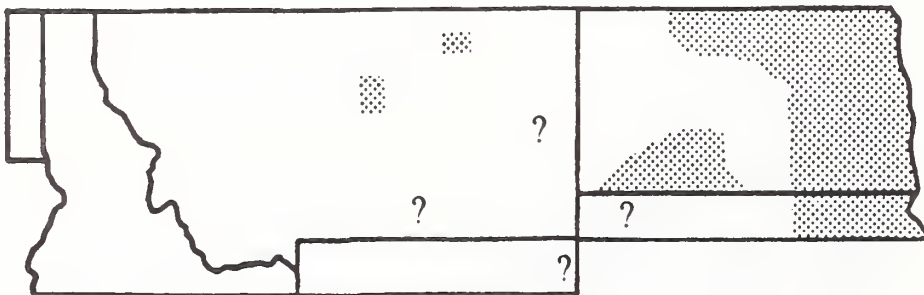
WINTERING AREA: 5

**HABITAT REQUIREMENTS:** Open riparian or other woodlands adjoining streams and lakes, usually near bridges or abandoned buildings on which it often builds its nest.

**FEEDING:** Sallies from exposed perch to capture insects in flight (often low over water), then returns to perch; also reported to occasionally take small aquatic vertebrates.

**STATUS AND MANAGEMENT:** No BBS data exist for Eastern Phoebes in the region. Over the entire range there has been a steady, slight decline although numbers throughout the East were up significantly in the most recent survey year. A common cowbird host which, in combination with problems of habitat loss on the wintering grounds, may be responsible for recent declines.

**FURTHER READING:** Weeks, 1978.



# SAY'S PHOEBE

*Sayornis saya*  
Tyrannidae

Summer Resident

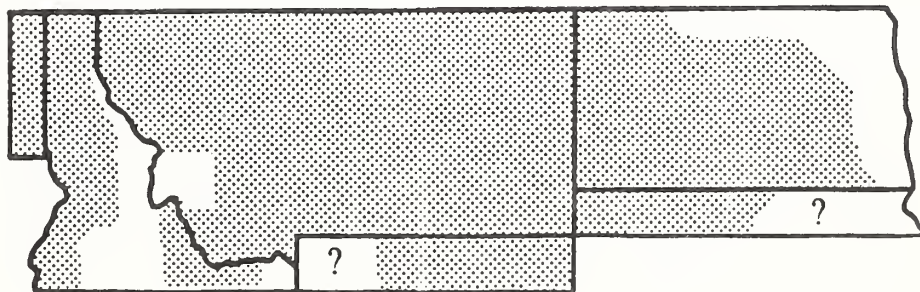
WINTERING AREA: 5

**HABITAT REQUIREMENTS:** Arid and semi-arid, open habitats including badlands, shrub steppe, grasslands, open woodland, and agricultural lands, rarely in montane areas. Nest is built on cliff ledge, in abandoned building, or beneath eaves on buildings, under bridges, or in road culverts.

**FEEDING:** Sallies from exposed perch to capture insects in flight, then returns to perch, or hovers to glean insects or (rarely) berries from vegetation. Not uncommonly forages low over streams or ponds but frequently found well away from water.

**STATUS AND MANAGEMENT:** Numbers appear stable in most of the region; In Idaho, based on a rather small sample size, there appears to be a slight declining trend. In the West as a whole, the picture is mixed with a slight declining trend overall and sharper declines in the most recent survey years.

**FURTHER READING:** Phillips et al., 1964 [DROP FOR SOMETHING BETTER]





# GREAT CRESTED FLYCATCHER

*Myiarchus crinitus*

Tyrannidae

Summer Resident

WINTERING AREA: 3

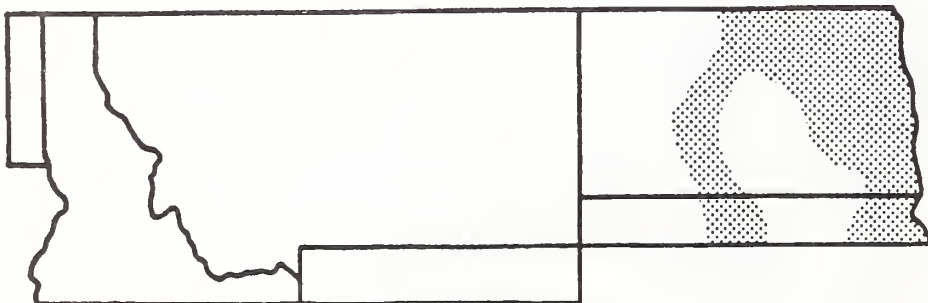
**HABITAT REQUIREMENTS:** Extensive tracts of mature floodplain, swamp, and upland deciduous forest with partially open canopies. Nests in natural or woodpecker-excavated cavities in live or dead deciduous trees.

**FEEDING:** Sallies from exposed perch to capture insects in flight, then returns to perch, or flies down to ground to capture insects, other terrestrial invertebrates, and small lizards. Includes small fruits in diet, especially berries, taken by hovering and picking them from plants.

**STATUS AND MANAGEMENT:** BBS data are scant for the region but numbers appear to be stable in

North Dakota, as elsewhere overall in the North American range. Numbers appear to have decreased significantly in the northeast and increased significantly in the upper midwest in the most recent survey years. Great Crested Flycatchers display relatively narrow habitat affinities for mature open deciduous forest, which in combination with their dependence on cavities for nesting, make them a species deserving of close monitoring. Highly vulnerable to tropical deforestation (Morton, 1992).

**FURTHER READING:** Ehrlich et al., 1988.



# CASSIN'S KINGBIRD

*Tyrannus vociferans*

Tyrannidae

Summer Resident

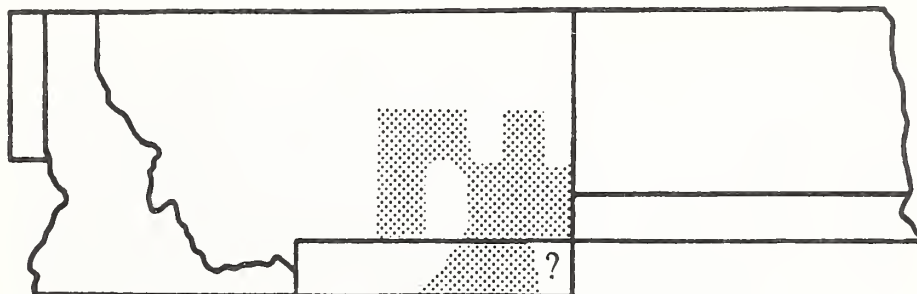
WINTERING AREA: 3

**HABITAT REQUIREMENTS:** Dry savanna, open scrub, shrub steppe, and especially pinyon-juniper woodland. Nests in trees.

**FEEDING:** Sallies from exposed perch to capture insects in flight, then returns to perch, also hovers and pounces on terrestrial insects. Includes a relatively large amount of small fruits in diet, often taken by hovering and picking them from plants.

**STATUS AND MANAGEMENT:** Southeastern Montana is the extreme northern limit of this species breeding range. No BBS data exist for Cassin's Kingbird in the region; appears to be declining slightly in the West but sample sizes are relatively small.

**FURTHER READING:** Blancher and Robertson, 1984, 1987; Ohlendorf, 1974.



# WESTERN KINGBIRD

*Tyrannus verticalis*  
Tyrannidae

Summer Resident

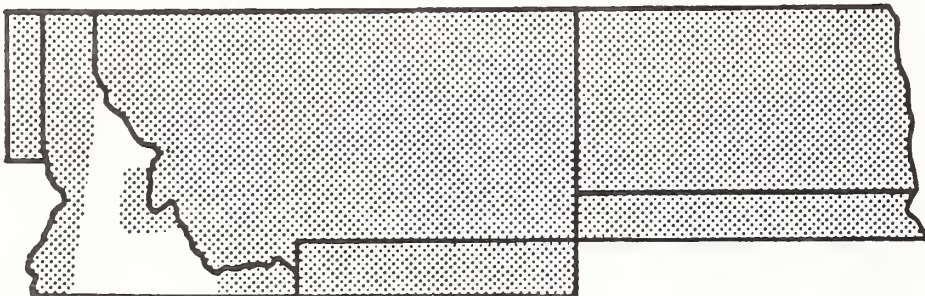
WINTERING AREA: 3

**HABITAT REQUIREMENTS:** Open country, especially savanna, forest edge, shelterbelts, wooded residential areas, and agricultural lands with scattered trees and shrubs, also riparian woodland. Nests in trees (usually deciduous) and sometimes in shrubs or on human-built structures.

**FEEDING:** Sallies from exposed perch to capture insects in flight, then returns to perch, also hovers and pounces on terrestrial insects. Includes small fruits in diet, especially berries, taken by hovering and picking them from plants.

**STATUS AND MANAGEMENT:** Numbers are stable or increasing slightly, significantly so in North Dakota, and exhibit a significant overall increase in the West viewed as a whole. Unlike most Neotropical migrant songbirds, Western Kingbirds have benefited greatly from the creation of edge-type habitats and have greatly expanded their range in the region since the early 1800's as a result of human-induced alterations of the landscape.

**FURTHER READING:** Blancher and Robertson, 1987; MacKenzie and Sealy, 1981; Murphy, 1988.



# EASTERN KINGBIRD

*Tyrannus tyrannus*

Tyrannidae

Summer Resident

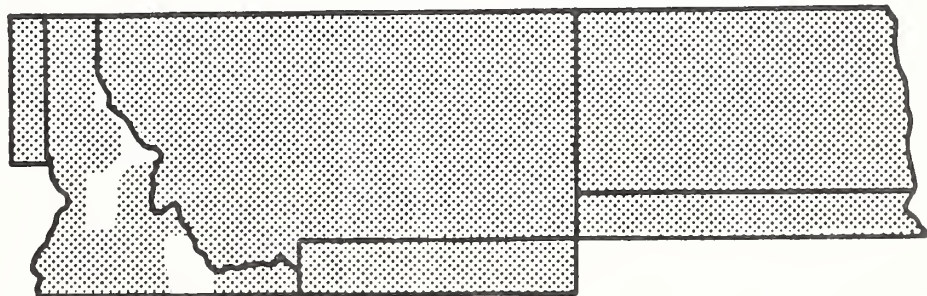
WINTERING AREA: 1

**HABITAT REQUIREMENTS:** Forest edge and open areas with scattered trees and shrubs, riparian woodland, agricultural lands with bushes and fencerows, shelterbelts, parks and wooded residential areas. Nests in deciduous tree, often isolated, and occasionally in shrub, on fencepost, stump, or human-built structure.

**FEEDING:** Sallies from exposed perch to capture insects in flight, then returns to perch, also hovers and gleans insects from vegetation. Also includes small fruits in diet, often taken by hovering and picking them from plants.

**STATUS AND MANAGEMENT:** Numbers appear to be declining in Idaho (especially in the most recent survey years) and Montana but increasing significantly in North Dakota. In general, numbers are down in the West and down across the North American range in general, with marked recent decreases in the Northeast. Eastern Kingbirds are common hosts of cowbirds.

**FURTHER READING:** Hayes and Robertson, 1989; McKittrick, 1990; Murphy, 1988.





# HORNED LARK

*Eremophila alpestris*  
Alaudidae

Permanent Resident throughout region except at highest elevations where it is a Summer Resident

WINTERING AREA: 6

**HABITAT REQUIREMENTS:** Open, treeless habitats from prairie to alpine tundra, including agricultural fields. Nests on the ground in a slight depression, with little or no cover.

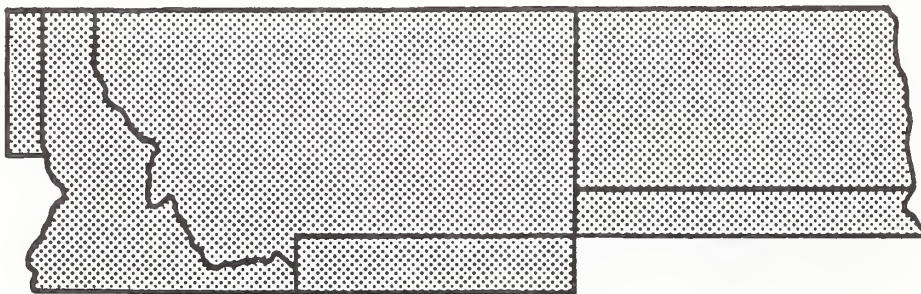
**FEEDING:** Forages on the ground gleaning seeds, insects, spiders, and snails.

**STATUS AND MANAGEMENT:** Numbers have decreased significantly in Idaho, increased significantly in Montana, and remained stable in North Dakota. For the West as a whole, numbers



have declined significantly and have declined slightly on a continent-wide basis as well, with significant recent increases in the midwest nearly offsetting decreases in the Great Plains and Rockies. Great ecological flexibility has enabled the Horned Lark to adapt well to agricultural fields and heavily grazed grasslands for breeding and foraging and thus greatly expand its range eastward since the early 1800's.

**FURTHER READING:** Beason and Franks, 1974; Hurley and Franks, 1976; Wiens et al., 1986.



# PURPLE MARTIN

*Progne subis*  
Hirundinidae

Summer Resident from central North Dakota  
eastward, Migrant throughout region

WINTERING AREA: 1

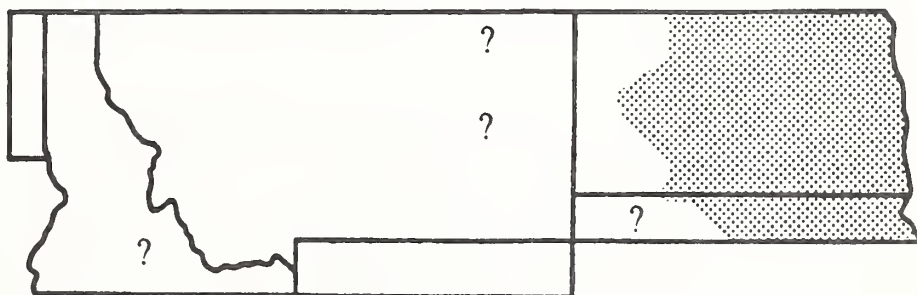
**HABITAT REQUIREMENTS:** Open country near water, but limited in the region largely to areas where communal martin nest houses are provided, thus found mostly in the vicinity of human habitations. Until the early 1900's, nests generally were placed in tree cavities in standing snags or live deciduous trees, in cliff niches, or in other cavities.

**FEEDING:** Forages aerially in prolonged flight, capturing flying insects. Occasionally lands on the ground to feed on ants or other insects.

**STATUS AND MANAGEMENT:** Numbers appear to be declining in North Dakota; populations have

declined markedly in the western portion of the U.S. but have stabilized for North America as a whole, although there are scattered significant declines in the most recent survey years. Has responded readily to provision of communal nest boxes for breeding, especially in the eastern part of range. The Purple Martin Conservation Association is currently conducting an intensive continent-wide effort to locate and monitor all breeding colonies.

**FURTHER READING:** Morton and Derrickson, 1990; Morton et al., 1990; Stutchbury, 1991.



# TREE SWALLOW

*Tachycineta bicolor*

Hirundinidae

Summer Resident

WINTERING AREA: 4

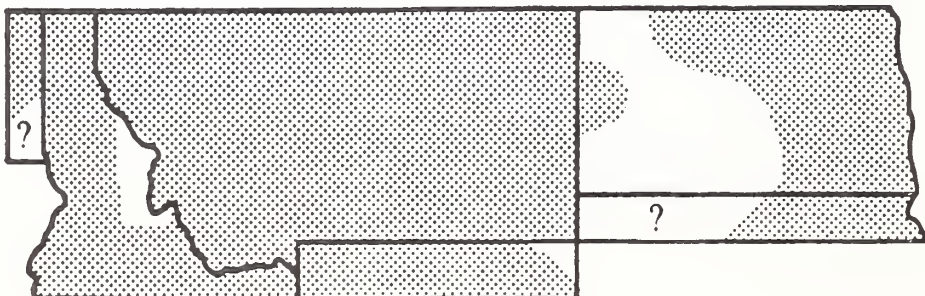
**HABITAT REQUIREMENTS:** Woodland of all types near water, especially with abundant standing snags. Nests in cavity in snag, also will use cavity in fence post or building.

**FEEDING:** Forages aerially in prolonged flight, capturing flying insects. When flying insects are unavailable, will glean berries or insects from vegetation.

**STATUS AND MANAGEMENT:** A trend of increasing numbers appears throughout the region, significantly so in the West as a whole, as well as throughout the North American range, although there have been significant declines in scattered parts of the range (including Idaho) in the most recent survey years. Favors riparian aspens for breeding sites in the region. As in other cavity-nesting species that cannot excavate their own nest

sites (i.e., "secondary" cavity nesters), breeding population size can be limited by both intra- and interspecific competition for suitable nest cavities, as well as by differential susceptibility of cavities to predation, by snag fall, and by the relative abundance of woodpeckers (i.e., "primary" cavity nesters) capable of excavating new cavities (Rendell and Robertson, 1989). Often nests colonially and will readily use nest boxes for breeding. Nest site selection, especially in terms of proximity to forest edge, can be influenced strongly by presence of House Wrens, which favor nest sites close to forest edge and readily destroy Tree Swallow clutches (Rendell and Robertson, 1990). Forms large premigratory flocks that roost communally.

**FURTHER READING:** Lombardo, 1991; St. Louis and Breebaart, 1991; Wheelwright and Dorsey, 1991; Williams, 1988; Winkler, 1992.



# VIOLET-GREEN SWALLOW

*Tachycineta thalassina*  
Hirundinidae

Summer Resident

WINTERING AREA: 4

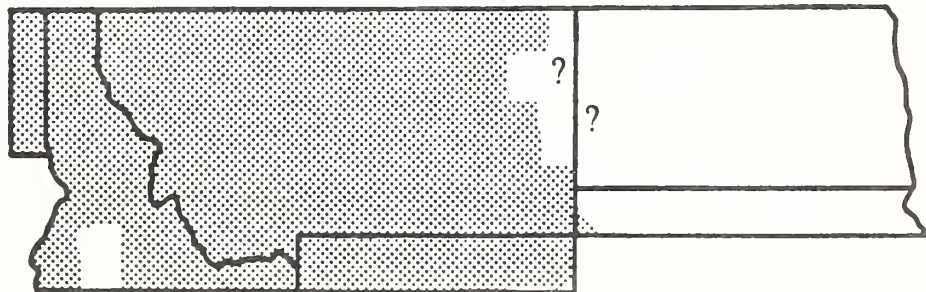
**HABITAT REQUIREMENTS:** Open, montane coniferous forest, aspen and riparian woodland. Nests in natural or woodpecker-excavated cavities in standing snags or live trees, less frequently in cliff niche or abandoned building.

**FEEDING:** Forages aerially in prolonged flight, capturing flying insects. Only rarely comes to the ground to feed on insects.

**STATUS AND MANAGEMENT:** Increasing significantly both in Idaho and Montana, with a

trend toward slight increase throughout its range in the west, significantly so in the most recent survey years. Occasionally nests in small colonies. Accepts nestbox as breeding site, especially in habitats where natural or woodpecker-excavated cavities are scarce or where interspecific competition for nest sites among secondary cavity nesters is high.

**FURTHER READING:** Brawn, 1990; Erskine, 1984.





# NORTHERN ROUGH-WINGED SWALLOW

*Stelgidopteryx serripennis*  
Hirundinidae

Summer Resident

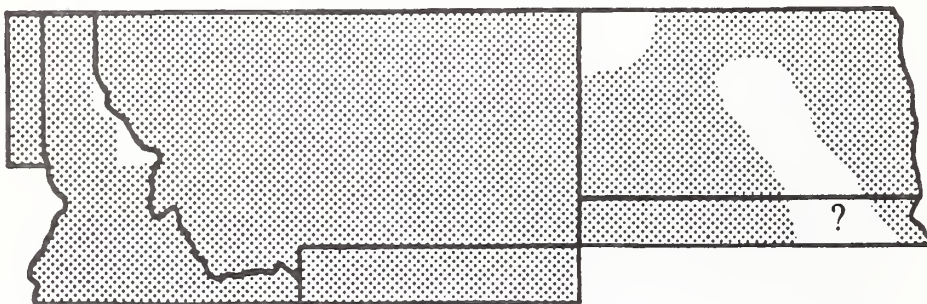
WINTERING AREA: 4

**HABITAT REQUIREMENTS:** Open areas in the vicinity of water, especially those having steep embankments or cliffs. Nests in burrows or crevices in steep river- or streambank, also in cliff niche, and in road culverts or beneath bridges. Nest burrows may be excavated by the birds but more often are abandoned burrows of mammals or kingfishers.

**FEEDING:** Forages aerially in prolonged flight, capturing flying insects. Occasionally descends to the ground to feed on insects.

**STATUS AND MANAGEMENT:** Numbers appear stable in Idaho and North Dakota but have declined significantly and rather sharply in Montana, but the general pattern in the west as a whole is one of stability, as is also the pattern continent-wide. However, significant declines have occurred in the most recent survey years in scattered parts of the range, including North Dakota. Nests in solitary pairs rather than colonially, although they occasionally nest within Bank Swallow colonies.

**FURTHER READING:** Lunk, 1962; Ricklefs, 1972.



# BANK SWALLOW

*Riparia riparia*  
Hirundinidae

Summer Resident

WINTERING AREA: 1

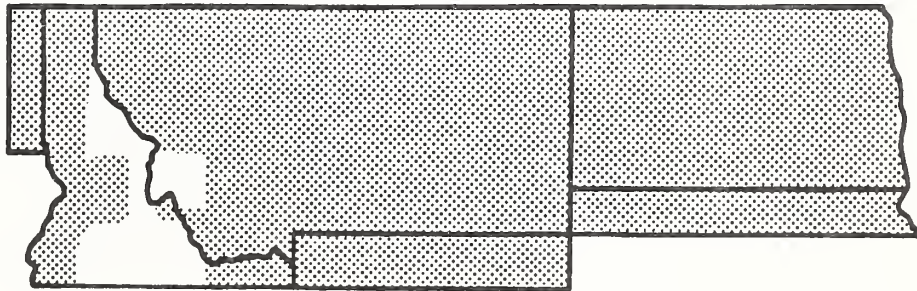
**HABITAT REQUIREMENTS:** Open country in association with water, especially rivers and streams. Nests in burrows in steep river- or streambank, roadcut, or gravel pit. Pairs usually excavate their own nest burrow, but sometimes will use abandoned kingfisher burrow.

**FEEDING:** Forages aerially in prolonged flight, capturing flying insects. Only rarely lands on the ground to feed on insects.

**STATUS AND MANAGEMENT:** Regional status is very mixed: populations are increasing significantly

in Idaho, decreasing significantly in Montana, and stable in North Dakota. Overall, western populations appear relatively stable as is also the case continent-wide for this widely distributed species. However, the most recent survey years exhibit steep, significant overall declines. Nests in colonies and forms large post-breeding flocks prior to migration, which roost communally.

**FURTHER READING** Beecher et al., 1981; Birchard and Kilgore, 1980; Freer, 1979; Stutchbury, 1988.



# CLIFF SWALLOW

*Hirundo pyrrhonota*  
Hirundinidae

Summer Resident

WINTERING AREA: 1

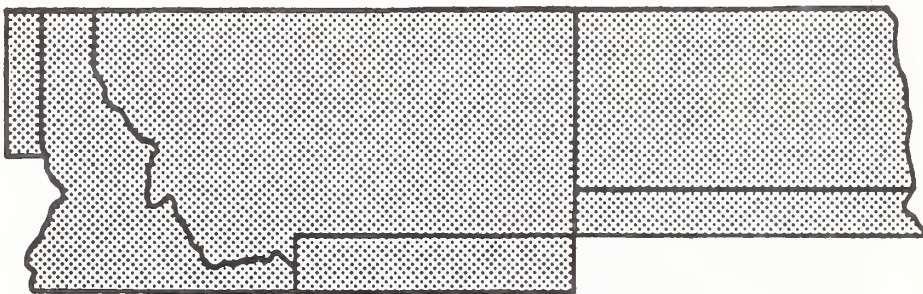
**HABITAT REQUIREMENTS:** Open country, usually in the vicinity of water. Nests on cliffs beneath overhangs, beneath bridges, in road culverts, and on buildings. Nests are often repaired and reused in subsequent years.

**FEEDING:** Forages aerially in prolonged flight, capturing flying insects. Occasionally feeds on berries.

**STATUS AND MANAGEMENT:** Slight increases are apparent in Idaho and Montana with significant

increases in North Dakota. Western populations in general show a slight increasing trend. A few scattered areas in eastern North America show declines, some of which are significant in recent survey years but the overall picture is relatively stable. Breeds colonially and may alternate colony site between years to reduce buildup of nest parasite populations.

**FURTHER READING:** Beecher et al., 1985; Brown and Brown, 1986, 1988; Shields, 1990; Withers, 1977.



# BARN SWALLOW

*Hirundo rustica*

Hirundinidae

Summer Resident

WINTERING AREA: 1

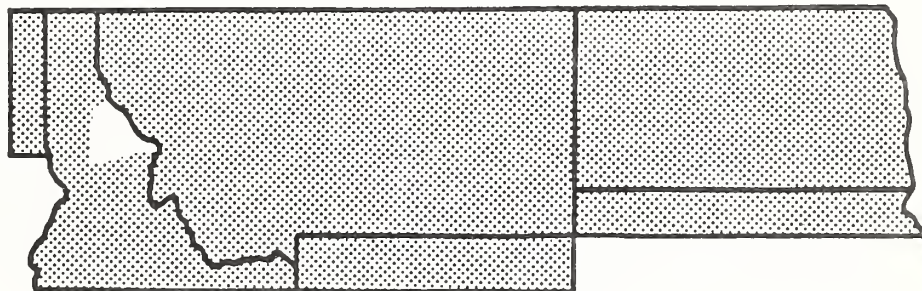
**HABITAT REQUIREMENTS:** Open areas, especially near water and frequently in association with human habitation and agricultural areas. Nests most often on or in buildings, also beneath bridges, in road culverts, and beneath overhangs on cliffs.

**FEEDING:** Forages aerially in prolonged flight, capturing flying insects. Occasionally feeds on berries and seeds.

**STATUS AND MANAGEMENT:** Numbers appear stable in Idaho and Montana but increasing significantly in North Dakota; Idaho populations

show a significant increase in numbers in the most recent survey year. Overall in the west, numbers are stable and show a small but significant increase continent-wide, although there has been a significant widespread decline in the most recent survey years, which is most pronounced from Colorado eastward to the Middle Atlantic states and northward to southeastern Canada. Nesting is sometimes loosely colonial.

**FURTHER READING:** Grzybowski, 1979; Medvin et al., 1987; Shields, 1984; Snapp, 1976.





# BROWN CREEPER

*Certhia americana*

Certhiidae

Permanent Resident from central Montana westward  
and occasional Winter Resident in North Dakota  
and eastern Montana

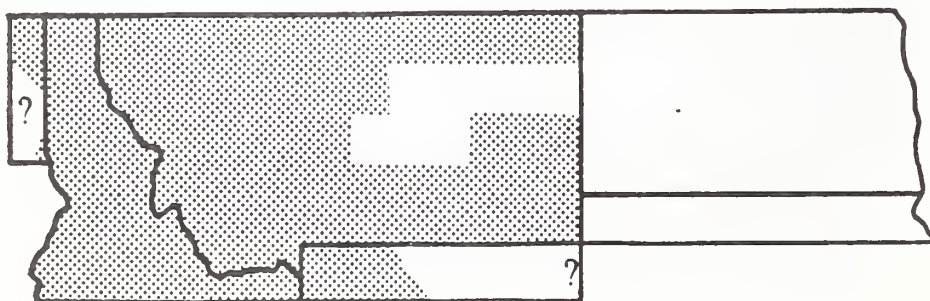
WINTERING AREA: 6

**HABITAT REQUIREMENTS:** Montane pine forests (especially ponderosa), mixed cedar/hemlock and other coniferous forest, and mixed coniferous-deciduous forests. Shuns pure or nearly-pure deciduous forests in central Rockies (Scott and Crouch, 1988b). Nests beneath loose bark on conifer tree, less frequently on deciduous tree.

**FEEDING:** Gleans insects, spiders, and other invertebrates from bark of tree trunks and branches, opportunistically hawks flying insects. Prefers larger trees as foraging substrates. Also infrequently takes nuts, berries, and acorns.

**STATUS AND MANAGEMENT:** Significantly declining in Idaho and unclear status in Montana due to infrequency on BBS routes there. Western populations in general appear to be increasing slightly, as is also the case for continent-wide pattern. Appears sensitive to forest fragmentation during breeding season and may be considered as a forest-interior nesting species (Aney, 1984; Keller and Anderson, 1992; Mannan and Meslow, 1984).

**FURTHER READING:** Davis, 1978; Franzreb, 1985; Hejl et al., 1988.



# ROCK WREN

*Salpinctes obsoletus*

Troglodytidae

Summer Resident, rare Permanent Resident in westernmost portion of region

WINTERING AREA: 5

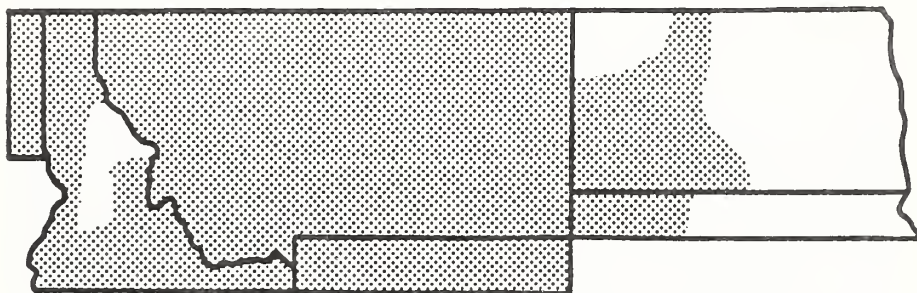
**HABITAT REQUIREMENTS:** Rocky habitats with brush or shrubs, especially cliff walls, talus slopes, and rock outcrops in montane areas, canyons, and badlands. Nests usually in rock crevices on steep slopes.

**FEEDING:** Forages for insects and other terrestrial invertebrates (possibly including small lizards) by gleaning items from the ground or low vegetation.

**STATUS AND MANAGEMENT:** Numbers appear to be increasing throughout the region, significantly

so in Montana. In the west overall, however, there is a slight declining trend. Occasional cowbird host. Rock Wrens have been little studied in the field resulting in many gaps in our knowledge of their ecology.

**FURTHER READING:** Tramontano, 1975; Wolf et al., 1985.



# HOUSE WREN

*Troglodytes aedon*  
Troglodytidae

Summer Resident

WINTERING AREA: 5

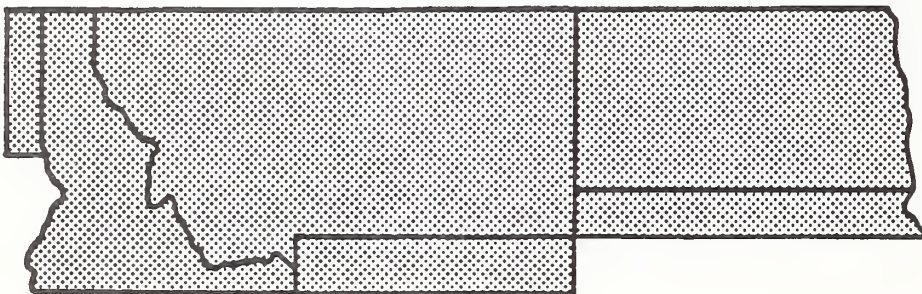
**HABITAT REQUIREMENTS:** Generally at lower elevations; riparian, aspen, and other sorts of open woodlands, also shrubby thickets, shelterbelts, farmlands, and areas of human habitation that are at least partially wooded. Nests in natural or woodpecker-excavated cavity in live tree, stump, or standing snag, but also will use a wide variety of other types of cavities.

**FEEDING:** Forages on the ground or in vegetation, gleaning insects and other terrestrial invertebrates from the surfaces of plants or directly from the ground.

**STATUS AND MANAGEMENT:** Populations appear stable in Idaho and Montana and significantly

increasing in North Dakota. Western populations as a whole are increasing significantly, as is also the case when considering the species continent-wide. House Wrens are often the most abundant avian species in deciduous woodlands of the Rockies (Finch, 1989). This species often destroys the eggs of other songbirds (including conspecifics) in the vicinity of their nests. Readily uses nestboxes.

**FURTHER READING:** Drilling and Thompson, 1991; Finch, 1990, 1991; Guinan and Sealy, 1989; Kermott et al., 1991; Rendell and Robertson, 1990.



# SEDGE WREN

*Cistothorus platensis*  
Troglodytidae

Summer Resident

WINTERING AREA: 5

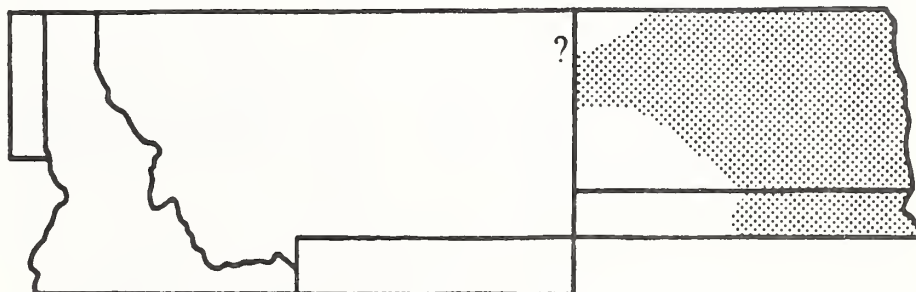
**HABITAT REQUIREMENTS:** Grassy fens, moist grasslands, old fields with dense growth, dense cultivated grain fields, shallow marshes dominated by sedges. Nests interwoven with live grasses.

**FEEDING:** Feeds on insects and spiders by foraging on the ground and in low vegetation, gleaning prey and possibly hawking flying insects, as well.

**STATUS AND MANAGEMENT:** Sedge Wrens do not appear frequently enough in the BBS data for the region to project long-term trends, however, numbers have declined significantly in North Dakota in the most recent survey years. Although the long-term

trend for the wren's North American range in its entirety is relatively stable, there have been significant, dramatic declines in the most recent survey years, especially in the upper midwest. Loss of freshwater wetlands likely has contributed to the increasing scarcity of this species. Sedge Wrens are nomadic, opportunistic breeders, with populations commonly shifting nesting areas between years. Known to destroy eggs of other small, marsh-nesting birds, including conspecifics.

**FURTHER READING:** Crawford, 1977; Picman and Picman, 1980.





# MARSH WREN

*Cistothorus palustris*  
Troglodytidae

Summer Resident, occasionally Permanent  
Resident in western and southwestern  
Montana

WINTERING AREA: 5



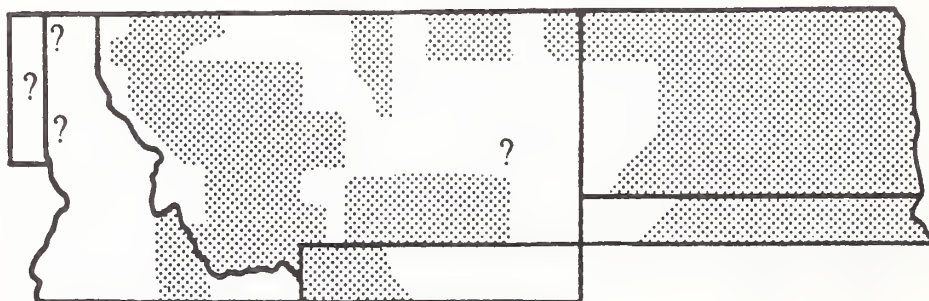
**HABITAT REQUIREMENTS:** Mostly at lower elevations; freshwater marshes, including reservoirs, with emergent rushes, sedges, cattails, or tule to support over-water nests.

**FEEDING:** Feeds on insects, snails, and other small aquatic invertebrates. Forages by gleaning prey from the ground or foliage and by hawking flying insects.

**STATUS AND MANAGEMENT:** Numbers are small but apparently stable in Idaho and Montana. Marsh Wrens appear to be more abundant and increasing slightly in North Dakota with significant increase

seen in the most recent survey year. Marsh Wrens are significantly increasing in the west as a whole, and appear to be stable or increasing slightly on a continent-wide basis. Favored nesting habitats in eastern portion of region are those with species of bulrush (Kantrud in Stewart, 1975). Known to destroy and sometimes consume eggs of other small, marsh-nesting birds, especially blackbirds and conspecifics.

**FURTHER READING:** Kroodsma, 1989; Leonard and Picman. 1986, 1987; Metz, 1991; Picman, 1984.



# RUBY-CROWNED KINGLET

*Regulus calendula*  
Sylviinae

Summer Resident, rare Winter Resident in westernmost portion of region

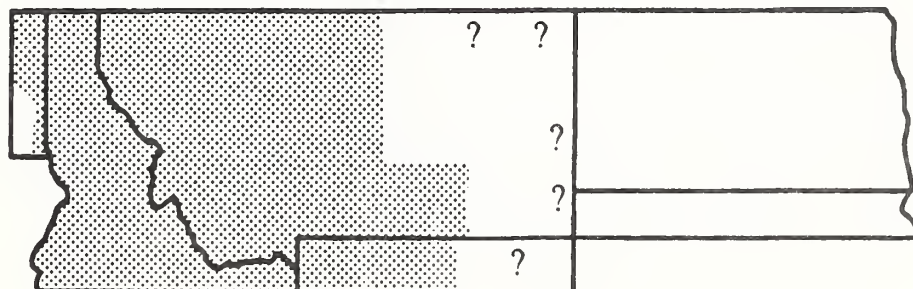
WINTERING AREA: 4

**HABITAT REQUIREMENTS:** Primarily coniferous forests and woodlands, but also found in mixed coniferous-deciduous woodland. Apparently avoids pure or nearly-pure deciduous forest in central Rockies (Scott and Crouch, 1988). Nests high in coniferous tree. In migration, also commonly uses riparian woodlands.

**FEEDING:** Takes insects and spiders in varied ways: forages in trees and shrubs gleaning items from leaves and bark, hovers and gleans, and hawks flying insects. Also feeds on tree sap at sapsucker wells, takes berries, and includes a few seeds in diet.

**STATUS AND MANAGEMENT:** Numbers show a slightly increasing trend in Idaho and appear to be stable in Montana, as elsewhere in the west. Continent-wide, the picture is mixed with overall stability as a result of declines in some areas being balanced by increases of the same magnitude elsewhere. Favors mature, dense coniferous forests for nesting. In contrast to the closely related Golden-crowned Kinglet, Ruby-crowns are generally more abundant in rotation-age forest than in old growth (Mannan and Meslow, 1984; Tobalske et al., 1991). Winter studies suggest that conditions experienced on the wintering grounds appear to control the size of subsequent breeding population. Breeding biology and breeding season ecology have been little studied.

**FURTHER READING:** Keast and Saunders, 1991.



# EASTERN BLUEBIRD

*Sialia sialis*  
Muscicapinae

Summer Resident

WINTERING AREA: 6

**HABITAT REQUIREMENTS:** Forest edge, open woodland with grasslands, shelterbelts, riparian woodland, aspen woodland. Aside from nestboxes, nests most commonly in woodpecker-excavated cavity in standing snag, less frequently in live tree, fence post, or utility pole.

**FEEDING:** Diet comprised primarily of insects, snails, earthworms, and other terrestrial invertebrates, and includes a substantial amount of small fruits, especially berries. Frequently hawks low flying insects from low perch, in addition to gleaning from foliage.

**STATUS AND MANAGEMENT:** Numbers appear to be stable in North Dakota. Eastern Bluebirds appear too infrequently on western BBS routes to

project a trend for western populations in general, but numbers for North America overall have stabilized with significant widespread increases in recent survey years. Listed as a Vulnerable Species in Canada. Sustained decline throughout the bluebird's range over the past several decades was attributed to competition with European Starlings and House Sparrows for nest cavities, competition with flocks of blackbirds and grackles for winter food supplies, impacts of pesticides, and severe winter weather; widespread successful campaign to promote use of nestboxes has led to recent increases in numbers.

**FURTHER READING:** Pinkowski, 1979; Plissner and Gowaty, 1988; Rendell and Robertson, 1990; Sauer and Droege, 1990; Zeleny, 1976.



# WESTERN BLUEBIRD

*Sialia mexicana*

Muscicapinae

Summer Resident

WINTERING AREA: 6

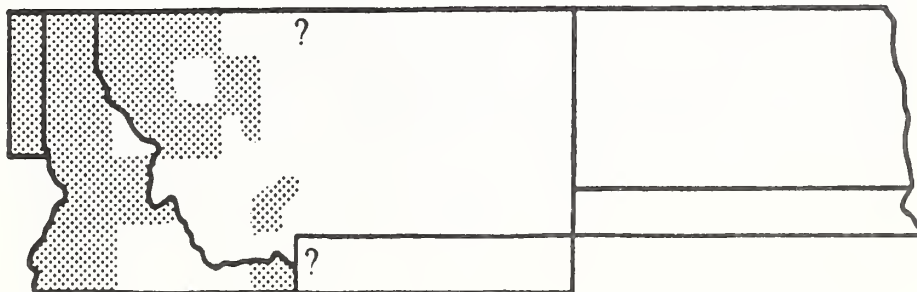
**HABITAT REQUIREMENTS:** Open coniferous or deciduous woodland with standing snags and interspersed patches of grasslands or adjacent montane meadows, riparian woodland, burned or logged areas with abundant standing snags. Nests in natural or woodpecker-excavated cavity favoring aspens or ponderosa pines.

**FEEDING:** Diet comprised primarily of insects, snails, earthworms, and other terrestrial invertebrates, and includes a substantial amount of small fruits, especially berries. Frequently hawks low flying insects or sallIES from low perch to capture prey on the ground, in addition to gleaning from foliage.

**STATUS AND MANAGEMENT:** Within the region, Western Bluebirds appear only on BBS routes in

Idaho and numbers are very small but indicate a significantly declining trend. The overall picture throughout the range is one of small but continued decline. In comparison to the Eastern Bluebird, the western species have not received widely instituted nestbox programs aimed at stemming widespread, long-term declines in their numbers. Competition with European Starlings and House Sparrows for nest cavities has been invoked as a significant factor in the Western Bluebird's decline. Surprisingly little fieldwork has been conducted on breeding biology and ecology.

**FURTHER READING:** Mock, 1991; Mock et al., 1991.





# MOUNTAIN BLUEBIRD

*Sialia currucoides*  
Muscicapinae

Summer Resident

WINTERING AREA: 5

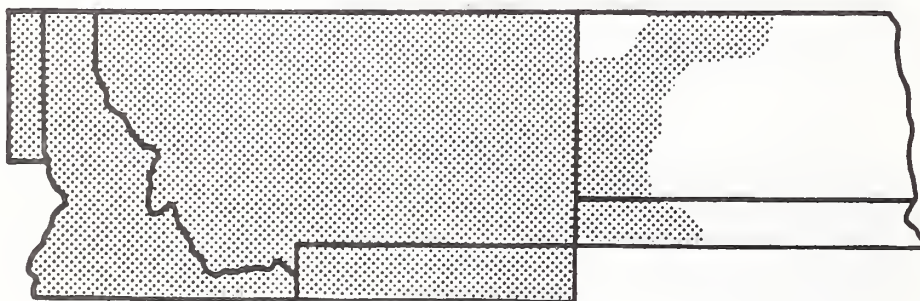
**HABITAT REQUIREMENTS:** Open woodland of all types, forest edge, badlands, occurring across all elevations with suitable habitat. Nests in natural or woodpecker-excavated cavity in standing snags.

**FEEDING:** Diet comprised primarily of insects, and includes few small fruits. Forages most frequently by swooping down from elevated perch to capture insects on the ground. Often hovers while gleaning items from the ground or from vegetation.

**STATUS AND MANAGEMENT:** Numbers have declined sharply in Idaho but appear to be stable in

Montana, and possibly in North Dakota as well, although sample sizes are exceedingly small there. Mountain Bluebirds have sustained marked declines in recent years but appear now to have stabilized in most parts of their range. In comparison to the Eastern Bluebird, the western species have not received widely instituted nestbox programs, although they readily will nest in suitable nestboxes.

**FURTHER READING:** Herlugson, 1981; Power, 1980.



# TOWNSEND'S SOLITAIRE

*Myadestes townsendi*

Muscicapinae

Permanent Resident but in many areas undergoes marked altitudinal migration to lower elevations in winter

WINTERING AREA: 5

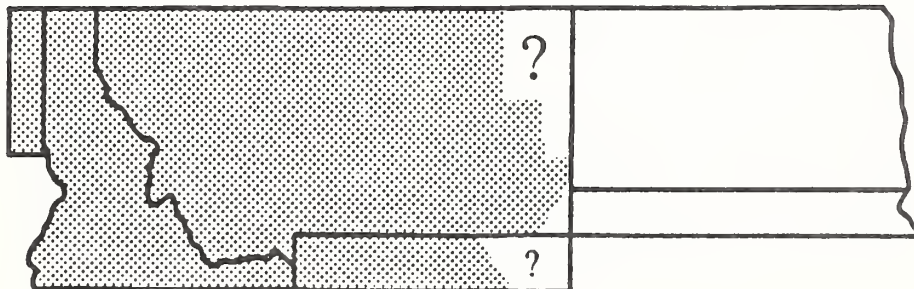
**HABITAT REQUIREMENTS:** Montane and subalpine open coniferous forest, especially on slopes, steep rocky areas with shrub thickets; also open woodland and riparian woodland in winter. Nests on the ground in well protected setting, frequently among tree roots or in brush pile.

**FEEDING:** Feeds on insects, spiders, worms, and other terrestrial invertebrates and includes substantial amount of small fruits, especially berries, in its diet. Often depends largely on berries, especially of juniper, in winter. Commonly forages by sallying from exposed perch in flycatcher-like fashion to

capture flying insects in flight. Also gleans insects and fruits from vegetation and feeds on the ground.

**STATUS AND MANAGEMENT:** Populations are declining significantly in Idaho, and appear to be declining slightly in Montana. In the west as a whole, populations display a trend toward slightly increasing numbers. In winter, often defends territory encompassing a supply of berries or other small fruits. Breeding biology and ecology is little known.

**FURTHER READING:** Lederer, 1977; Salomonson and Balda, 1977.



# VEERY

*Catharus fuscescens*  
Muscicapinae

Summer Resident

WINTERING AREA: 1

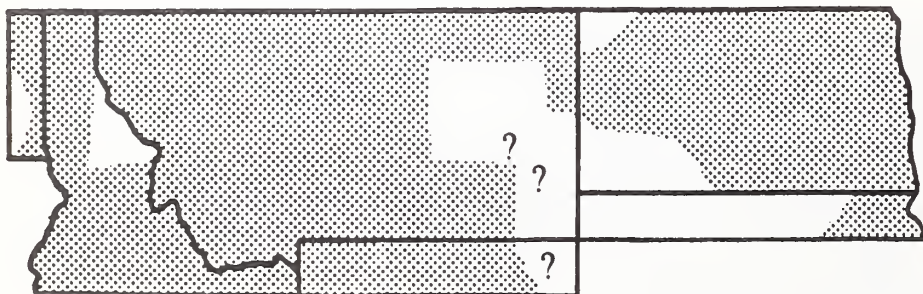
**HABITAT REQUIREMENTS:** Usually near water in moist, deciduous forest (especially aspen) with shrubby understory, also second growth, swamps, and riparian thickets. Nests on the ground, low in shrub, or on top of low stump.

**FEEDING:** Breeding season diet is almost exclusively comprised of insects and spiders, only occasionally including a few other terrestrial invertebrates. Small fruits are consumed primarily in autumn. Usually feeds on the ground by picking items from the substrate or from vegetation; commonly feeds in bluebird-like fashion by swooping down from low

perch to capture insects on the ground. Also gleans from foliage in low shrubs, but only rarely hawks flying insects.

**STATUS AND MANAGEMENT:** Numbers appear to be declining throughout the region, most significantly so in North Dakota. A slight declining trend is apparent throughout the west and continent-wide. A common cowbird host.

**FURTHER READING:** Bertin, 1977; Holmes and Robinson, 1988; Noon, 1981.



# SWAINSON'S THRUSH

*Catharus ustulatus*  
Muscicapinae

Summer Resident

WINTERING AREA: 3



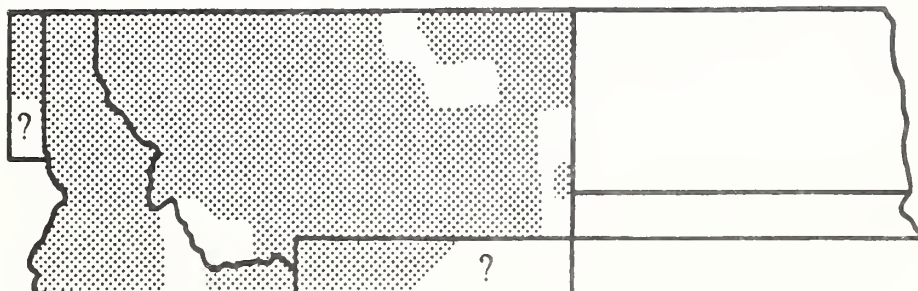
**HABITAT REQUIREMENTS:** Mixed conifer old growth, especially with moist, wooded slopes, and shrubby understories, aspen forests with dense shrubs, swamps and riparian thickets; also dense woodlands of all sorts in migration. Usually nests low in dense shrub, occasionally in small conifer tree, almost always near water.

**FEEDING:** Primarily consumes insects and spiders, only occasionally including other terrestrial invertebrates and small fruits. Forages on the ground to a lesser extent than the other ecologically similar ground thrushes; instead mostly forages by gleaning prey from foliage, by swooping down from low perch to capture prey on the ground, by gleaning while hovering, and by hawking flying insects.

**STATUS AND MANAGEMENT:** Regional picture is mixed with a declining trend in Idaho and a stable or

slightly increasing trend in Montana. The overall pattern in the west is one of slight decline and one of relative stability continent-wide, although there have been significant decreases in the Canadian prairie provinces in the most recent survey years and extensive, widespread decline in the Sierra Nevada (Hejl et al., 1988). Swainson's Thrush is closely associated with old-growth mixed conifer forests (Finch and Reynolds, 1988; Hejl and Woods, 1991; Mannan and Meslow, 1984; Tobalske et al., 1991). Scattered declines have been linked, in part, to loss of Central American wintering habitat (Marshall, 1988); highly vulnerable to tropical deforestation (Morton, 1992).

**FURTHER READING:** Cherry, 1985; Holmes and Robinson, 1988; Noon, 1981; Sealy, 1974; Winker et al., 1992.





# HERMIT THRUSH

*Catharus guttatus*  
Muscicapinae

Summer Resident

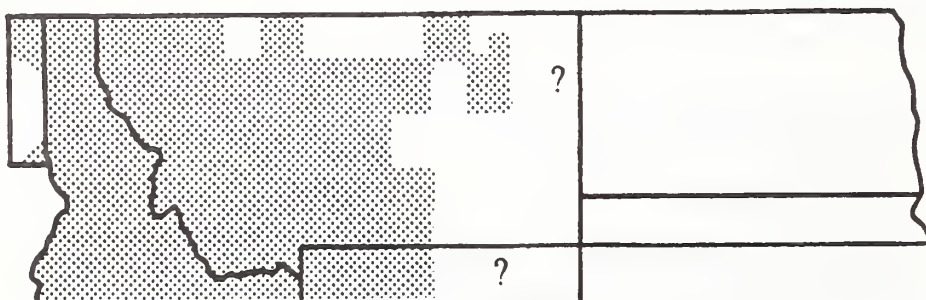
WINTERING AREA: 4

**HABITAT REQUIREMENTS:** Moist coniferous or mixed coniferous-deciduous woodland are preferred but also found in drier spruce, ponderosa pine, or other coniferous woodland. Nests generally in low coniferous or deciduous tree, less frequently on the ground.

**FEEDING:** Takes insects, spiders, earthworms, small salamanders, and small fruits. Feeds primarily on the ground, but also gleans from foliage in shrubs and low trees, hovers to glean, and hawks flying insects.

**STATUS AND MANAGEMENT:** Slight declining trend in Idaho but a significantly increasing trend in Montana. A significantly increasing trend is the pattern for the west as a whole with a generally increasing trend continent-wide. Significantly more abundant in old-growth Douglas-fir/ponderosa pine than in rotation-age forest (Hejl and Woods, 1991; Mannan and Meslow, 1984). Nesting populations in old growth are sensitive to forest fragmentation (Keller and Anderson, 1992).

**FURTHER READING:** Holmes and Robinson, 1988; Martin and Roper, 1988; Noon, 1981; Sealy, 1974.



# AMERICAN ROBIN

*Turdus migratorius*

Muscicapinae

Summer Resident, much less commonly a Permanent Resident, throughout the region

## WINTERING AREA: 6

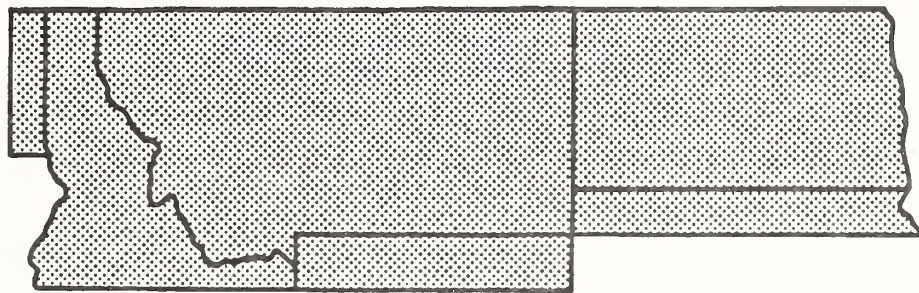
**HABITAT REQUIREMENTS:** Extremely widely distributed: open woodlands, forests, scrub, cultivated lands, grazed grasslands with scattered trees or shrubs, vicinity of human habitations. Usually nests in deciduous trees but also nests in conifers, shrubs, on human-built structures, and rarely on the ground. Need for mud in construction of nests results in their generally being built in the vicinity of water or moist ground.

**FEEDING:** Insects, earthworms, snails, and other invertebrates, as well as small fruits. Forages primarily on the ground, but also gleans from foliage.

**STATUS AND MANAGEMENT:** Numbers are increasing throughout the region, most significantly

so in North Dakota; numbers increased significantly in Idaho in the most recent survey year. Overall, populations appear generally stable in the west, with a small but significant increasing trend seen continent-wide. American Robins expanded their range into the Great Plains and drier lowlands of the west as European-style agriculture extended into these areas and created suitable nesting and foraging sites. Responds positively to controlled burns in ponderosa pine woodland (Bock and Bock, 1983).

**FURTHER READING:** Hejl et al., 1988; Jung, 1982; Smith and Montgomerie, 1991; Weatherhead and McRae, 1990; Wheelwright, 1986.



# GRAY CATBIRD

*Dumetella carolinensis*

Mimidae

Summer Resident

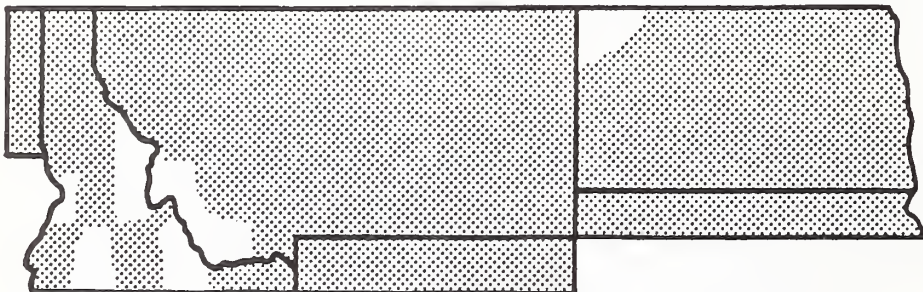
WINTERING AREA: 4

**HABITAT REQUIREMENTS:** Low, dense thickets, usually in moist situations: often bordering woodland or in other open areas, riparian thickets, aspen woodland with shrub understory, mature shelterbelts, farmsteads and other areas of human habitations providing shrub thickets and scattered trees. Avoids coniferous forests and woodlands. Nests typically in dense shrubs.

**FEEDING:** Insects, spiders, and small fruits are taken by foraging on the ground and by gleaning from foliage.

**STATUS AND MANAGEMENT:** Numbers appear stable in Idaho but declining in Montana and North Dakota, however populations exhibit an increasing trend in the west overall. Considered on a continent-wide basis, numbers appear stable.

**FURTHER READING:** Darley et al., 1977; Johnson and Best, 1982; Yahner, 1991.



# NORTHERN MOCKINGBIRD

*Mimus polyglottos*

Mimidae

Rare Summer Resident, even rarer Winter Resident

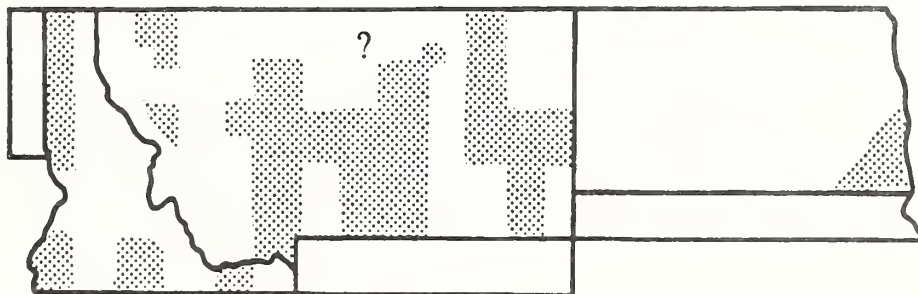
WINTERING AREA: 6

**HABITAT REQUIREMENTS:** Open and partly open habitats at lower elevations, mostly associated with farmsteads and other areas of human habitations providing shrub thickets and scattered trees interspersed with mowed lawns or meadows. Usually nests in shrubs, less frequently in low trees or vine tangles.

**FEEDING:** Takes a wide variety of insects and other terrestrial invertebrates as well as small fruits. Feeds primarily on the ground but also gleans from foliage.

**STATUS AND MANAGEMENT:** BBS data for this species are too few within the region to project population trends. In the west overall, numbers appear to be declining very slightly, and for the North American range as a whole there is a small but significant declining trend. Northern Mockingbirds have only recently expanded into the region.

**FURTHER READING:** Breitwisch et al., 1989; Derrickson, 1988; Logan, 1991; Zaias and Breitwisch, 1989.





# SAGE THRASHER

*Oreoscoptes montanus*  
Mimidae

Summer Resident

WINTERING AREA: 5

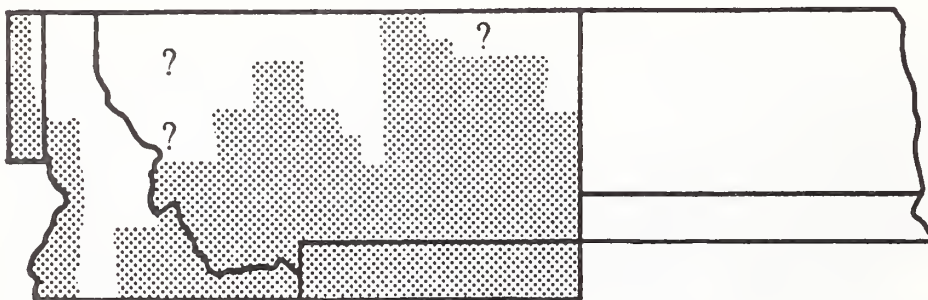
**HABITAT REQUIREMENTS:** Mostly at lower elevations in shrubsteppe, almost invariably associated with sagebrush communities. Nests in shrub, usually sagebrush, or on ground beneath shrub. Selects nest sites in the tallest, most dense clumped shrubs, surrounded by little if any bare ground (Petersen and Best, 1991).

**FEEDING:** Diet comprised of insects and other terrestrial invertebrates, as well as small fruits, especially berries. Forages on the ground and gleans

foliage.

**STATUS AND MANAGEMENT:** Populations appear to be increasing in Idaho and Montana, as well as elsewhere generally throughout the west, although numbers declined significantly in Idaho in the most recent survey year.

**FURTHER READING:** Reynolds, 1981; Reynolds and Rich, 1978; Rotenberry and Wiens, 1989.



# WATER PIPIT

*Anthus spinoletta*  
Motacillidae

Summer Resident, rarely a Permanent Resident  
in westernmost portion of region

WINTERING AREA: 4

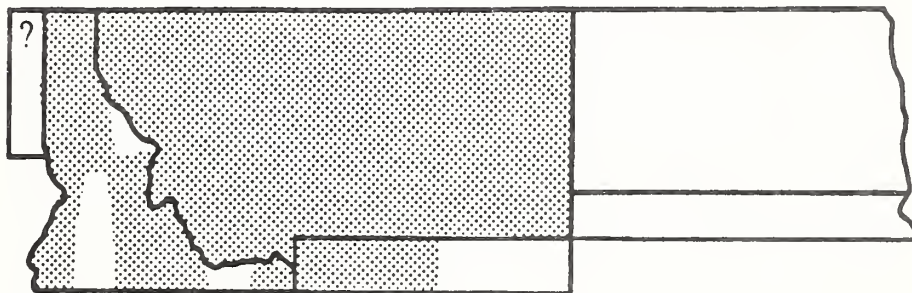


**HABITAT REQUIREMENTS:** Alpine tundra and high, moist, montane meadows; grasslands and riverine habitats in migration. Nests on the ground in slight depression, usually protected by rock or clump of low vegetation.

**FEEDING:** Diet is comprised of insects, small aquatic invertebrates, seeds, and a few berries. Forages by gleaning items from the ground, occasionally hawks flying insects from the ground, and not averse to wading in shallow water to hunt small aquatic prey.

**STATUS AND MANAGEMENT:** No BBS data for this species are available from anywhere in the region. Very few BBS routes encompass alpine tundra habitat, hence the Water Pipit has been recorded on only 10 BBS routes in the west. Although few in number, the indicated population trend is one of significant decline.

**FURTHER READING:** Hendricks, 1991; Miller and Green, 1987; Verbeek, 1970.



Transient throughout north central and eastern Montana

# SPRAGUE'S PIPIT

*Anthus spragueii*  
Motacillidae

Summer Resident

WINTERING AREA: 5

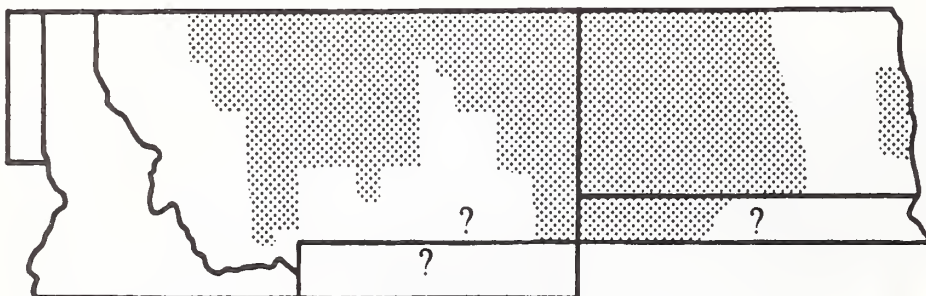
**HABITAT REQUIREMENTS:** Closely associated with extensive tracts of native shortgrass prairies, also alkaline meadows. Nests on the ground in clumps of grass or sedge.

**FEEDING:** Feeds on insects and seeds of grasses and forbs. Forages on the ground.

**STATUS AND MANAGEMENT:** Declining in both Montana and North Dakota, with significant declines

over the species range as a whole. Usually found only in ungrazed or very lightly grazed prairie; numbers have undergone a pronounced decline due to loss of native prairie habitat by conversion to agriculture and by habitat degradation resulting from livestock grazing. Breeding biology and ecology are little known.

**FURTHER READING:** Ehrlich, et al., 1988



# CEDAR WAXWING

*Bombycilla cedrorum*  
*Bombycillidae*

Summer Resident from Idaho westward, Permanent Resident or Summer Resident from westernmost Montana eastward

WINTERING AREA: 4

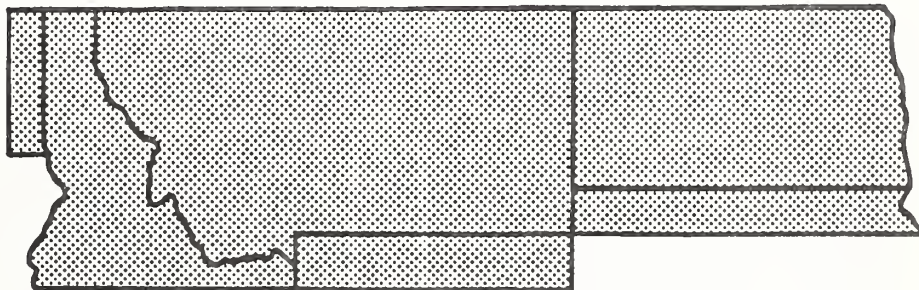
**HABITAT REQUIREMENTS:** Open habitats providing berries: deciduous or coniferous woodland, forest edge, riparian woodland, farmsteads, shelterbelts, and any other open habitats (including around human habitations) with scattered trees. Usually nests in deciduous tree, less frequently in coniferous tree. Occasionally refurbishes and reuses old or abandoned waxwing nest.

**FEEDING:** One of the most fruit-dependent bird species in North America, taking mostly berries, but also consuming insects, flowers, and tree sap. Feeds

primarily by gleaning from vegetation but also hawks flying insects.

**STATUS AND MANAGEMENT:** Numbers are declining slightly in Idaho but increasing in Montana and North Dakota. Populations are increasing significantly in the west as a whole, as well as continent-wide. Feeds gregariously in large winter flocks.

**FURTHER READING:** Leck and Cantor, 1979; McPherson, 1987; Mountjoy and Robertson, 1988a, b; Rothstein, 1976a, b.





# LOGGERHEAD SHRIKE

*Lanius ludovicianus*  
Laniidae

Summer Resident, rarely a Winter Resident



WINTERING AREA: 5

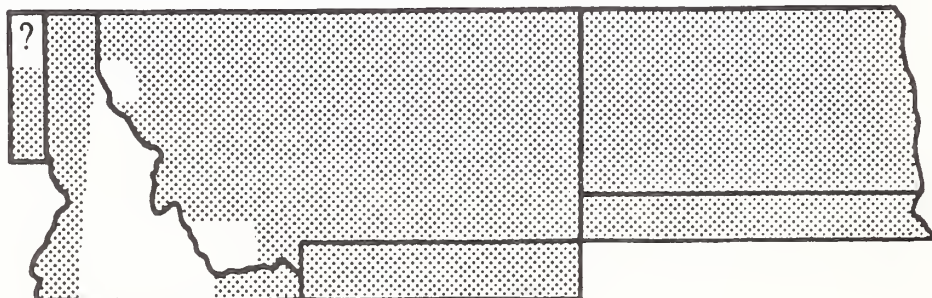
**HABITAT REQUIREMENTS:** Open country from prairies to montane meadows providing scattered trees and shrubs, also pinyon-juniper woodland, shrub steppe, arid scrub, croplands, shelterbelts. Nests in trees or shrubs, sometimes in tangle of vines. Occasionally refurbishes and reuses nests of other shrikes and of other passerines.

**FEEDING:** Primarily feeds on insects but also frequently takes small birds and occasionally mice or lizards, but only rarely consumes carrion. Swoops down onto prey from elevated perch, including fenceposts or utility lines, or pursues birds in rapid, sustained flight, knocking them to the ground with a blow from the beak.

**STATUS AND MANAGEMENT:** Significantly declining in North Dakota but more or less stable in the rest of the region, although numbers have fluctuated greatly in Montana and Idaho. Western populations as a whole have undergone sustained significant declines and the picture is no better in the

east as the species has declined significantly on a continent-wide basis. The eastern subspecies is a candidate for federal Threatened or Endangered status in the U.S. In eastern Canada, the Loggerhead Shrike is listed as Endangered, while elsewhere throughout its range in Canada it is listed as a Threatened Species. Habitat loss and pesticide contamination are thought responsible for widespread declines but there is little real understanding of the factors responsible. Recent studies in the upper Midwest and in the Southeast implicate problems associated with survival on the wintering grounds as being responsible for continued declines in breeding populations (Brooks and Temple, 1990; Gawlik and Bildstein, 1990), although site fidelity to breeding territories may be unusually low in Loggerhead Shrikes, thus leading to inherently low return rates (Haas and Sloane, 1989).

**FURTHER READING:** Fraser and Luukkonen, 1986; Morrison, 1980; Porter et al., 1975.



# BELL'S VIREO

*Vireo bellii*

Vireonidae

Summer Resident

WINTERING AREA: 3

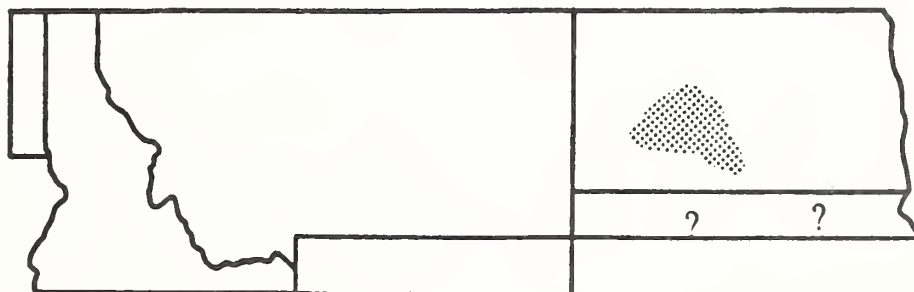
**HABITAT REQUIREMENTS:** Dense, riparian thickets of shrubs or small trees. Nests in dense shrub or low tree.

**FEEDING:** Nearly exclusively insects with a few berries added to the diet in late summer. Feeds by gleaning from foliage.

**STATUS AND MANAGEMENT:** Bell's Vireo reaches the northernmost point of its breeding range in North Dakota where it is too rare to have been encountered on regional BBS routes. Throughout its range, the species is recorded too infrequently on BBS routes to provide statistically meaningful population projections, other than to indicate that it continues in

widespread decline. The subspecies of Bell's Vireo found in California is federally listed as an Endangered Species, having disappeared from all but five percent of its former U.S. range. Widespread decline throughout the vireo's range has been linked closely with destruction of riparian habitats through channelization for flood control and agriculture and degradation of riparian habitats as a result of livestock grazing. A further important factor has been heavy nest parasitism by cowbirds.

**FURTHER READING:** Baird and Rieger, 1989; Barlow, 1962; Greaves, 1989; Hendricks and Rieger, 1989; Kus and Miner, 1989; Nolan, 1960; Olson and Gray, 1989.



# SOLITARY VIREO

*Vireo solitarius*  
Vireonidae

Summer Resident

WINTERING AREA: 4

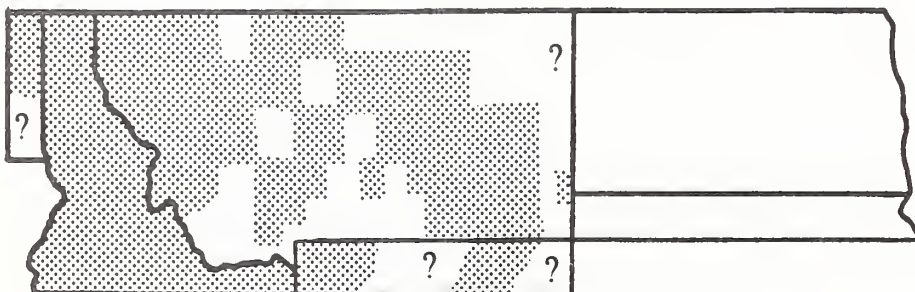
**HABITAT REQUIREMENTS:** Open woodlands with shrub understories: mixed coniferous-deciduous or coniferous woodland, montane woodland, and pine-dominated woodland. Nests are usually placed low in deciduous or coniferous trees.

**FEEDING:** Nearly exclusively insects with a few berries added to the diet in late summer or autumn. Feeds by gleaning from foliage, hawking flying insects, and gleaning from the bark surfaces of branches.

**STATUS AND MANAGEMENT:** Apparently declining in Idaho and Montana, but stable in the west as a whole and increasing significantly when

data from all BBS routes are combined continent-wide, although behavioral data indicate that the eastern and western North American populations may in fact be separate species. Favors rotation-age rather than old-growth forest (Hejl and Woods, 1991) but is apparently sensitive to forest fragmentation (Aney, 1984). Responds positively to controlled burning of ponderosa pine forest or woodland (Bock and Bock, 1983). A common cowbird host and may suffer very heavy rates of parasitism in some western localities (Marvil and Cruz, 1989).

**FURTHER READING:** Barclay, 1977; James, 1978.



# YELLOW-THROATED VIREO

*Vireo flavifrons*  
Vireonidae

Summer Resident

WINTERING AREA: 4

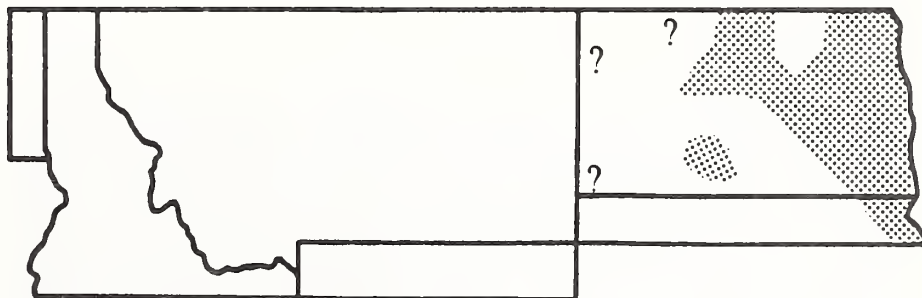
**HABITAT REQUIREMENTS:** Mature deciduous forests and riparian woodland. Nests in deciduous trees.

**FEEDING:** Nearly exclusively insects with a few berries added to the diet in autumn. Feeds by gleaning from foliage.

**STATUS AND MANAGEMENT:** This species does not occur in the BBS database for North Dakota. In its North American range as a whole, the vireo has

declined steadily, although numbers appear to have stabilized in the most recent survey years. The Yellow-throated Vireo is an eastern species that reaches the northwestern edge of its breeding range in North Dakota. Population declines in New England suburban habitats have been linked to pesticide spraying of deciduous trees. Extremely vulnerable to tropical deforestation (Morton, 1992).

**FURTHER READING:** James, 1978; Smith et al., 1978.





# RED-EYED VIREO

*Vireo olivaceus*  
Vireonidae

Summer Resident

WINTERING AREA: 1

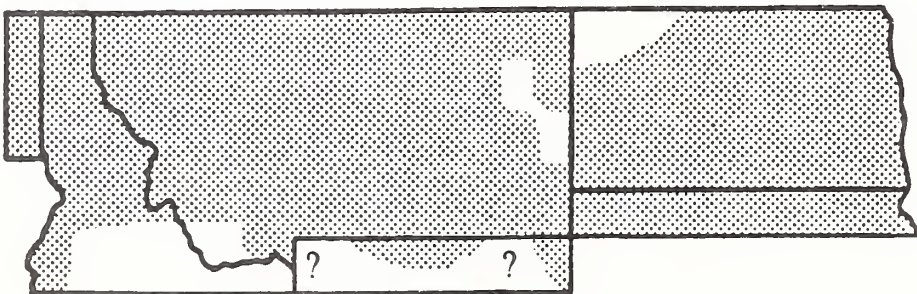
**HABITAT REQUIREMENTS:** Aspen, poplar, or other deciduous forest and woodland, riparian woodland, well-treed areas in the vicinity of human habitations. Nests in dense shrubs or deciduous trees.

**FEEDING:** Nearly entirely insects with a few other terrestrial invertebrates taken occasionally and berries added opportunistically. Feeds most frequently by gleaning from vegetation while hovering, but also forages by gleaning from foliage.

**STATUS AND MANAGEMENT:** Infrequently encountered on Idaho BBS routes but apparently declining there, and declining in Montana and North Dakota, as well. Following steady declines throughout their range, Red-eyed Vireos now appear to be stable in the west as a whole and increasing

slightly when viewed continent-wide, although significant declines in several parts of eastern North America were reported in the most recent survey years. Spraying of hardwood forest with pesticides to control gypsy moths necessitated a tripling in size of foraging areas by individual Red-eyed Vireos and caused a substantial shift in diet as a result of reduced caterpillar densities, but reproductive impacts have not been assessed (Cooper et al., 1990). One of the species most frequently parasitized by cowbirds. Highly vulnerable to tropical deforestation (Morton, 1992).

**FURTHER READING:** Barlow and Rice, 1977; Darveau et al., 1992; Graham, 1988; Pletschet, 1987; Robinson, 1981; Williamson, 1971.



# WARBLING VIREO

*Vireo gilvus*  
Vireonidae

Summer Resident

WINTERING AREA: 3



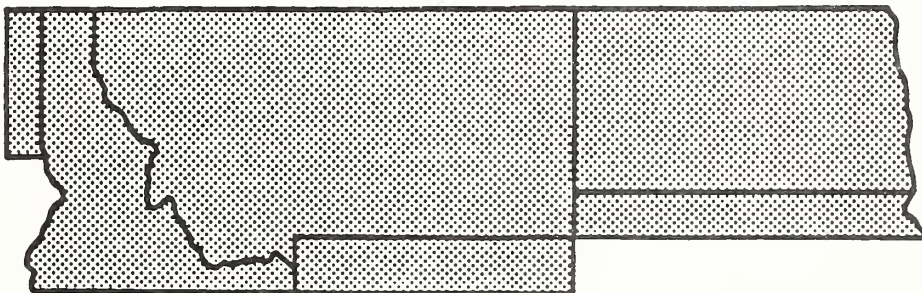
**HABITAT REQUIREMENTS:** Typically found in mature riparian woodland, but also uses open deciduous forests and woodlands, aspen or birch groves within coniferous forest, mature shelterbelts and well-wooded farmsteads. Nests in deciduous trees or shrubs.

**FEEDING:** Almost entirely insects and spiders plus a few berries. Feeds by gleaning from foliage and by gleaning from vegetation while hovering.

**STATUS AND MANAGEMENT:** Populations appear to be increasing throughout the region, significantly so in North Dakota. Increasing significantly in the

west as a whole, which drives an overall trend of significant increase continent-wide, although there have been significant declines in several parts of the eastern range in the most recent survey years. Reduction in extent of uncut aspen stands and conifer invasion of aspen forest are likely to negatively impact vireo populations (Finch and Reynolds, 1988). Population declines in suburban areas within the eastern North American range have been linked to pesticide spraying of deciduous trees. Common cowbird host.

**FURTHER READING:** Howes-Jones, 1985; James, 1976; Pletschet, 1987.



# TENNESSEE WARBLER

*Vermivora peregrina*  
Parulinae

Summer Resident

WINTERING AREA: 3

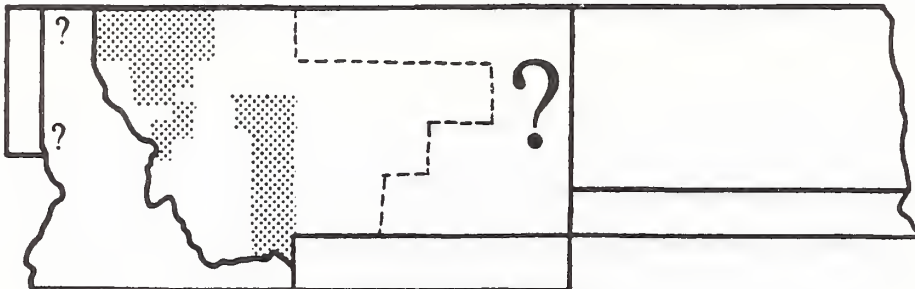
**HABITAT REQUIREMENTS:** Deciduous or mixed deciduous-coniferous woodland with aspen or poplar, boggy thickets. Nests on the ground, usually at base of low shrub or in sphagnum hummock (in boggy areas).

**FEEDING:** Largely insects but includes some small berries. Forages most often at the ends of branches by gleaning from foliage and bark.

**STATUS AND MANAGEMENT:** Appears too infrequently in the BBS database for the region to

project population trends. The trend in the west as a whole is one of slight increase, as is the case also on a continent-wide basis, although there has been a widespread declining trend in the most recent survey years. Tennessee Warblers are spruce budworm specialists—populations respond rapidly to budworm outbreaks and crashes, resulting in marked regional fluctuations in numbers from year to year.

**FURTHER READING:** Morse, 1989; Quay, 1989; Winker et al., 1991.



# ORANGE-CROWNED WARBLER

*Vermivora celata*

Parulinae

Summer Resident

WINTERING AREA: 4

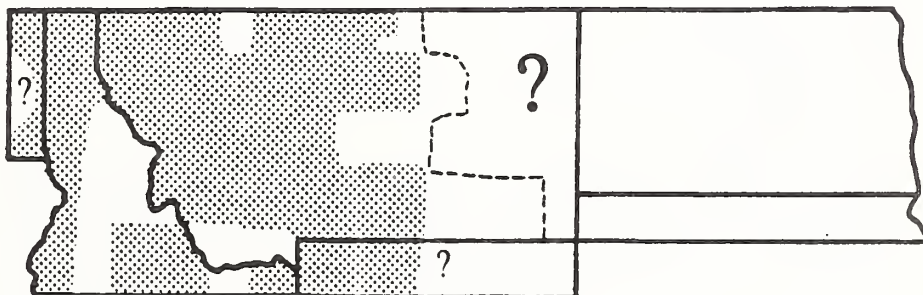
**HABITAT REQUIREMENTS:** Riparian thickets and woodland, open brushy woodland, shrubby, post-fire communities, aspen groves, forest edge. Nests usually or exclusively on the ground.

**FEEDING:** Takes insects, fruit, and floral nectar by gleaning from foliage and branches. Also consumes tree sap at sapsucker wells.

**STATUS AND MANAGEMENT:** Numbers appear to be declining in Idaho and Montana, mirroring an

overall declining trend in the west and continent-wide, although overall numbers increased significantly in the most recent survey year. Although widespread, many details of breeding biology are unknown.

**FURTHER READING:** Foster, 1969; Morrison, 1981; Morse, 1989.





# NASHVILLE WARBLER

*Vermivora ruficapilla*

Parulinae

Summer Resident

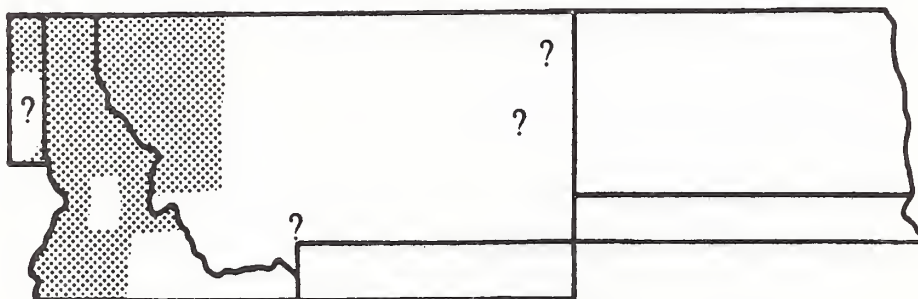
WINTERING AREA: 4

**HABITAT REQUIREMENTS:** Open deciduous woodland or deciduous groves in coniferous woodland, riparian woodland, second growth, forest-edged bogs; in all cases, prefers areas with shrub undergrowth. Nests on the ground, generally beneath a shrub.

**FEEDING:** Diet is comprised wholly of insects which are captured by gleaning from foliage and branches and by hovering while gleaning and occasionally foraging on the ground.

**STATUS AND MANAGEMENT:** Within the region, frequency of occurrence on BBS routes has been too little and pattern of occurrence has been too erratic to project meaningful population trends. Overall pattern in the west has been a trend of small but significant increase, with a slight increasing trend seen continent-wide, as well. Across its range overall, the Nashville Warbler is most closely associated with second growth deciduous woodlands.

**FURTHER READING:** Johnson, 1976; Morse, 1989.



# YELLOW WARBLER

*Dendroica petechia*

Parulinae

Summer Resident

WINTERING AREA: 4

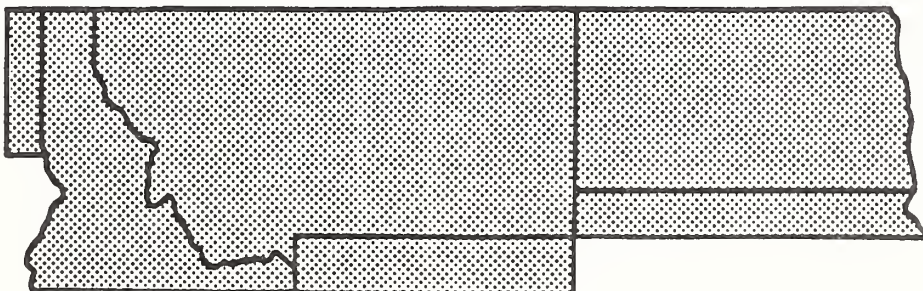
**HABITAT REQUIREMENTS:** Primarily associated with riparian thickets (especially of willows) and riparian woodland with dense understories; also found in shelterbelts, well wooded areas of towns and farmsteads. Nests in dense shrub or in small deciduous tree.

**FEEDING:** Diet is comprised mostly of insects but also will include a few berries in diet. Forages primarily by foliage gleaning and also gleans from bark of branches, hawks flying insects, and hovers to glean from vegetation.

**STATUS AND MANAGEMENT:** Numbers appear to be declining in Idaho, stable in Montana, and declining in North Dakota. In the west as a whole, populations appear to have stabilized following sharp declines in recent decades. The continent-

wide trend indicates small but significant increase, although numbers have declined significantly in the far west in the most recent survey years. The Yellow Warbler is one of the three most frequently parasitized species by cowbirds and has the largest breeding range of any wood-warbler. Western populations have declined markedly in response to loss of riparian thickets due to a combination of drought, channelization for flood control and agriculture, and impacts from livestock grazing. Populations respond well to willow restoration and regeneration that occur when riparian areas are protected from cattle (Taylor and Littlefield, 1986).

**FURTHER READING:** Busby and Sealy, 1979; Graham, 1988; Morris, 1989; Schroeder, 1982a; Sealy, 1992; Sealy et al., 1989; Weatherhead, 1989; Wiedenfeld, 1992.



# YELLOW-RUMPED WARBLER

*Dendroica coronata*  
Parulinae

Summer Resident, rare Permanent Resident in western  
Montana and Idaho

WINTERING AREA: 4

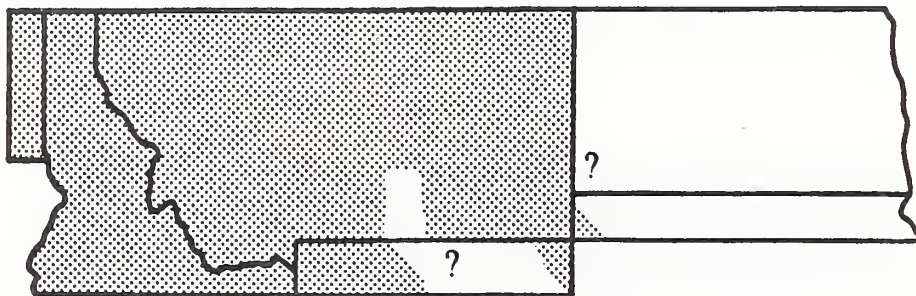
**HABITAT REQUIREMENTS:** Open to dense, montane coniferous forest. There is also a small breeding population in southwestern North Dakota in an isolated tract of ponderosa pine forest. Nests in coniferous trees.

**FEEDING:** Primarily insects but regularly includes waxy berries in diet, especially outside of the breeding season. Forages primarily by gleaning from foliage but also commonly hawks flying insects and hovers while gleaning from vegetation.

**STATUS AND MANAGEMENT:** Populations appear to be increasing significantly in Idaho, but declining

slightly in Montana, with no data from North Dakota. In the west overall, numbers appear to be stable, while continent-wide there is a small but significantly increasing trend. Significantly more abundant in old growth than in rotation-age forests (Hejl and Woods, 1991), and significantly more abundant in unfragmented compared to fragmented forests (Keller and Anderson, 1992). Responds positively to prescribed burning of open ponderosa pine forest and woodland (Bock and Bock, 1983). This is arguably the most abundant North American warbler.

**FURTHER READING:** Morse, 1989; Place and Stiles, 1992.



# TOWNSEND'S WARBLER

*Dendroica townsendi*

Parulinae

Summer Resident

WINTERING AREA: 4

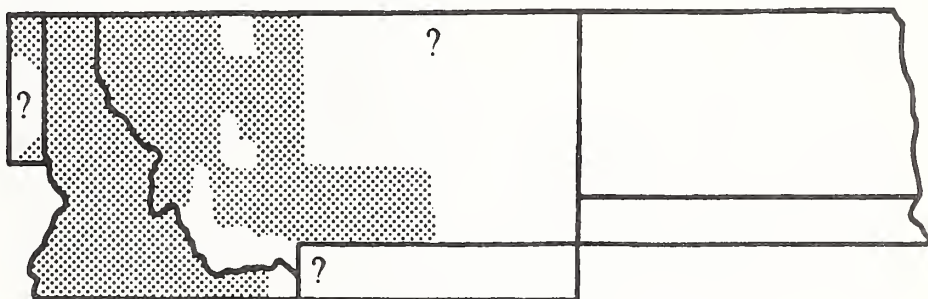
**HABITAT REQUIREMENTS:** Mature coniferous and mixed coniferous-deciduous forest. Nests in conifer trees. In old-growth Douglas-fir/ponderosa pine in northeastern Oregon, nest sites are associated with high canopy volumes of grand and Douglas-fir (Mannan and Meslow, 1984).

**FEEDING:** Largely or entirely insects, but may include plant galls and a few seeds. Generally forages high in trees by gleaning items from the vegetation and occasionally hawking flying insects.

**STATUS AND MANAGEMENT:** Within the region, frequency and pattern of occurrence on BBS routes

are erratic; numbers appear to be declining in Idaho and increasing in Montana, but it is chancy at best to attempt projections from these data. Overall pattern in the west is a trend of slight increase in numbers. Consistently more abundant in old growth coniferous forests and sensitive to forest fragmentation (Hejl and Woods, 1984; Mannan and Meslow, 1984; Tobalske et al., 1991). Townsend's Warbler should be considered as an interior-forest nesting species. Breeding biology has been little studied.

**FURTHER READING:** Jackson et al., 1992; Morrison, 1983; Morse, 1989.





# BLACK-AND-WHITE WARBLER

*Mniotilta varia*

Parulinae

Summer Resident

WINTERING AREA: 4

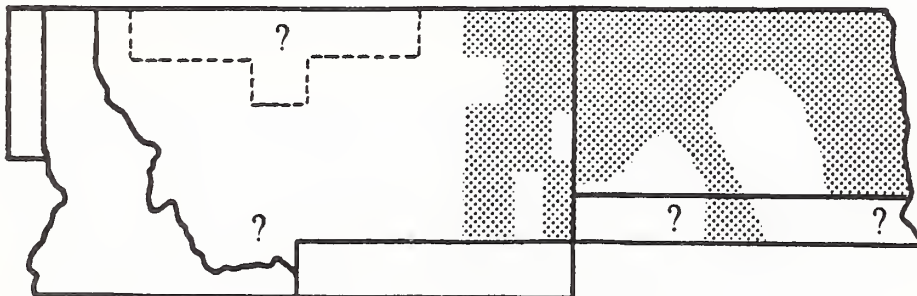
**HABITAT REQUIREMENTS:** Open deciduous woodland, mixed woodland in badlands, second growth deciduous woodland. Nests on the ground, usually well concealed by low branches of shrub.

**FEEDING:** Consumes insects gleaned from bark of tree branches and trunks in a nuthatch-like foraging manner, but also capable of gleaning from foliage.

**STATUS AND MANAGEMENT:** Numbers appear to be declining in North Dakota but sample sizes are

very small. Sample sizes for the west as a whole are likewise very small but numbers appear to be relatively stable. This is primarily an eastern species and numbers on a continent-wide basis appear stable with significant increases in several areas in the most recent survey years. The Black-and-White Warbler is considered to be an interior-forest nesting species. Highly vulnerable to tropical deforestation. (Morton, 1992). Frequent cowbird host.

**FURTHER READING:** Morse, 1989.



# AMERICAN REDSTART

*Setophaga ruticilla*  
Parulinae

Summer Resident

WINTERING AREA: 3

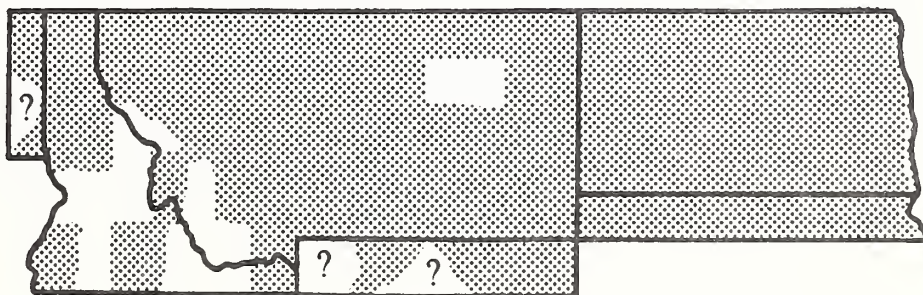
**HABITAT REQUIREMENTS:** Mature deciduous forest, open deciduous (including riparian) and mixed deciduous-coniferous woodland, forest edge, and second growth, aspen groves. Nests in deciduous tree or shrub, occasionally using abandoned nests of other small songbirds.

**FEEDING:** Forages on insects primarily by hovering while gleaning from foliage, also hawks flying insects and gleans from vegetation while moving through trees and shrubs.

**STATUS AND MANAGEMENT:** Populations exhibit a declining trend in Montana, the only part of the region with reasonable sample sizes from the BBS database; numbers appear to be stable in Idaho and increasing slightly in North Dakota but sample sizes

are exceedingly small for both states. The trend in the west overall as well as continent-wide is one of relative stability, although there was a sharp, significant decline in continent-wide numbers in the most recent survey years. There is strong evidence that the size of some breeding populations is determined by impacts of nest predators and brood parasites on the breeding grounds (Sherry and Holmes, 1992), while other populations may be most limited by conditions encountered on the wintering grounds (Bennett, 1980).

**FURTHER READING:** Lemon et al., 1992; Maurer and Whitmore, 1981; Morse, 1989; Procter-Gray, 1991; Sabo and Holmes, 1983; Secunda and Sherry, 1991; Sherry and Holmes, 1988.



# OVENBIRD

*Seiurus aurocapillus*

Parulinae

Summer Resident

WINTERING AREA: 4

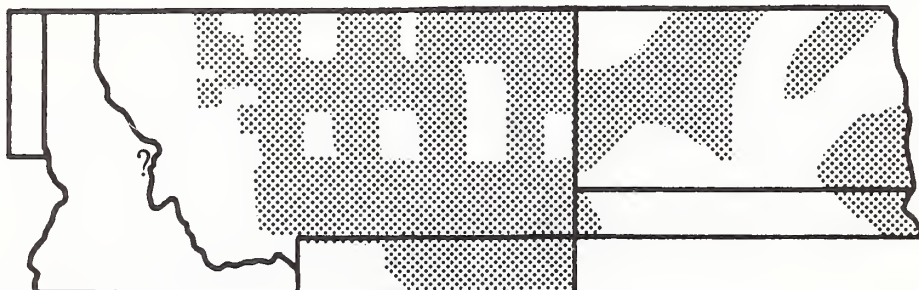
**HABITAT REQUIREMENTS:** Mature forests: floodplain deciduous forests, upland deciduous or (less frequently) mixed deciduous-coniferous forests on north-facing slopes. Nests on the ground.

**FEEDING:** Diet is comprised mostly of insects supplemented with spiders, snails, earthworms, and other terrestrial invertebrates. Forages on the ground, picking items from the substrate or in leaf litter, only occasionally gleaning from foliage or bark in shrubs and saplings.

**STATUS AND MANAGEMENT:** Sample sizes are small within the region but numbers appear to be stable or increasing slightly in Montana and North Dakota. Similarly, the number of BBS routes with

Ovenbirds in the west overall is small but numbers appear to be stable, as appears also to be the pattern continent-wide, based on a much larger sample size, although some areas in eastern North America exhibited significant declines in the most recent survey years while other areas experienced significant increases. Ovenbird populations are sensitive to forest fragmentation and the species is considered to be an interior-forest nesting species. Highly vulnerable to tropical deforestation (Morton, 1992). Frequent cowbird host.

**FURTHER READING:** Holmes and Robinson, 1988; Morse, 1989; Smith and Shugart, 1987; Zach and Falls, 1975.



# NORTHERN WATERTHRUSH

*Seiurus motacilla*

Parulinae

Summer Resident

WINTERING AREA: 4

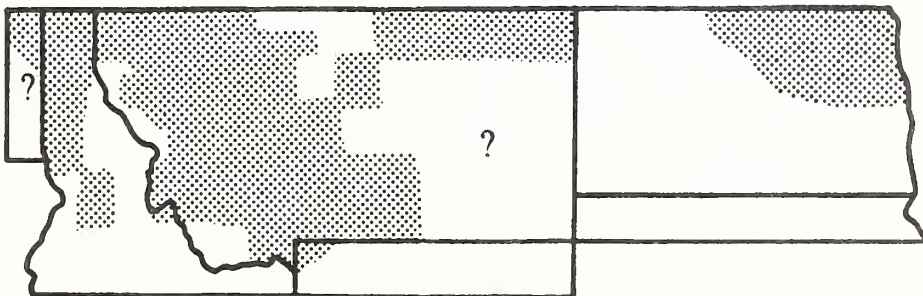
**HABITAT REQUIREMENTS:** Montane woodlands with bogs or other standing water, wooded riparian swamps and second growth swamp-forests, wooded edges of ponds, lakes, and streams. Nests close to water, on the ground amid roots of upturned trees or beneath overhang in streambank.

**FEEDING:** Feeds on small aquatic invertebrates, including insects, and on terrestrial insects and other invertebrates. Forages on the ground, usually at water's edge or wading in shallow water, often flipping through leaf litter and pulling dead leaves from the water to inspect them for adherent prey.

Also gleans from low foliage and occasionally hawks flying insects from the ground.

**STATUS AND MANAGEMENT:** Numbers appear to be stable or increasing in Idaho and Montana but sample sizes are very small from Idaho and rather erratic from Montana. Western populations taken as a whole show a significantly increasing trend, while the pattern continent-wide is one of apparent slight increase.

**FURTHER READING:** Craig, 1987; Winker et al., 1992.





# MACGILLIVRAY'S WARBLER

*Oporornis tolmiei*

Parulinae

Summer Resident

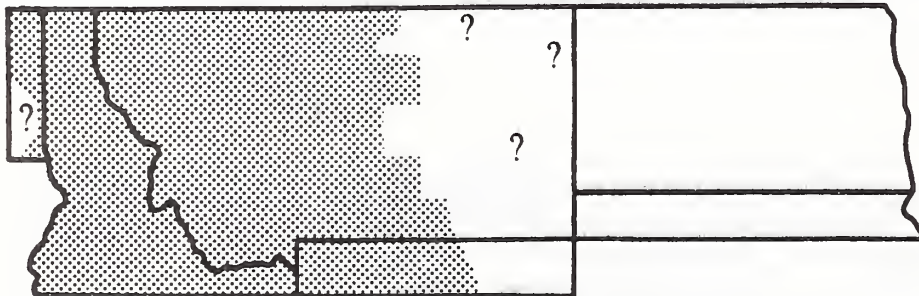
WINTERING AREA: 3

**HABITAT REQUIREMENTS:** Riparian thickets (especially willow), dense undergrowth of coniferous forest and forest edge, moist, brushy, montane slopes. Nests low in dense shrub or on the ground.

**FEEDING:** Entirely insects so far as known, although sap from sapsucker wells is taken when available in willows. Forages primarily by gleaning foliage low in shrubs but also gleans from bark of branches and feeds on the ground, as well.

**STATUS AND MANAGEMENT:** Numbers appear to be declining in Idaho but relatively stable or slightly increasing in Montana. Overall pattern in the west is one of slight decline. Breeding biology has been little studied. An uncommon cowbird host.

**FURTHER READING:** Hutto, 1981; Morrison, 1981.



# COMMON YELLOWTHROAT

*Geothlypis trichas*

Parulinae

Summer Resident

WINTERING AREA: 4

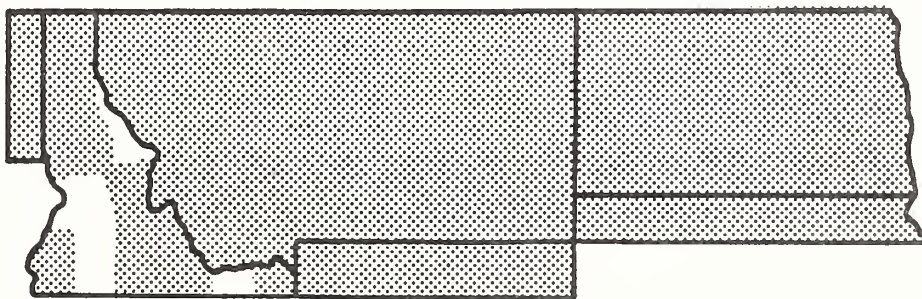
**HABITAT REQUIREMENTS:** Wet or at least moist habitats: montane willow thickets around beaver ponds, marshy areas, riparian thickets, wet meadows, wooded wetland borders, shelterbelts, partially wooded residential areas. Nests low in shrub.

**FEEDING:** Diet comprised of insects and spiders, with few other small invertebrates. Forages mostly in brush and low shrubs by gleaning from foliage and bark, also hovers to glean from vegetation, and hawks flying insects.

**STATUS AND MANAGEMENT:** Numbers appear to be increasing in Idaho but declining in Montana

and North Dakota, with significant declines in the most recent survey year in North Dakota. In the west as a whole, populations show a significant increasing trend in contrast to a continent-wide declining trend, significantly so in the most recent survey year, with significant declines in several parts of the eastern U.S. and in British Columbia. In North Dakota, favors wet meadows dominated by prairie cordgrass adjacent to streams and ponds. One of the three most frequent cowbird hosts.

**FURTHER READING:** Atwood, 1992; Hutto, 1981b; Lewis, 1972; Ritchison, 1991; Wunderle, 1978.

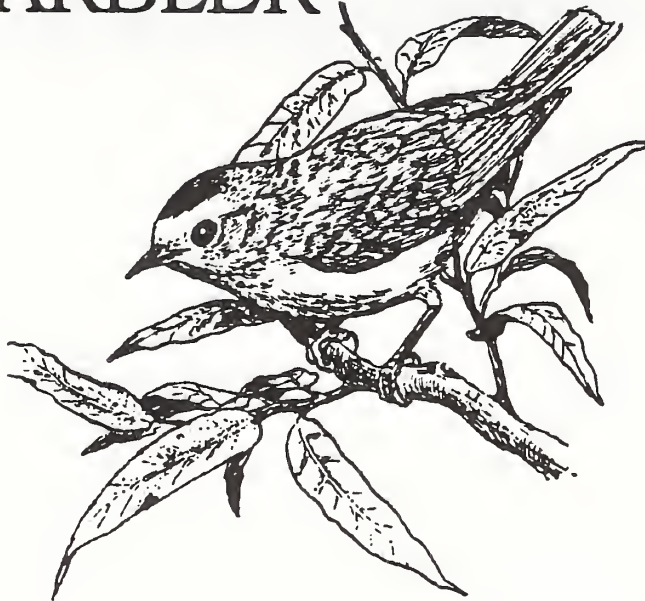


# WILSON'S WARBLER

*Wilsonia pusilla*  
Parulinae

Summer Resident

WINTERING AREA: 4

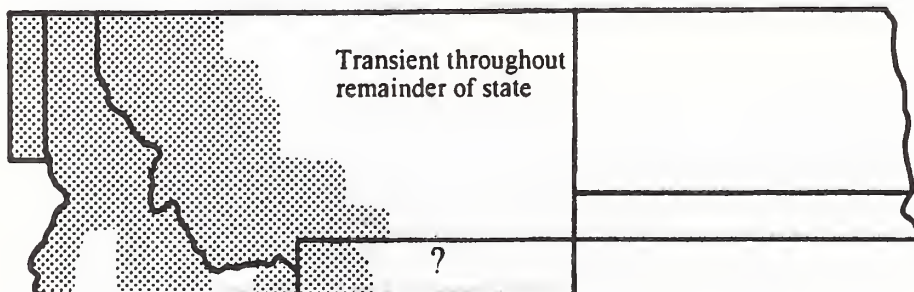


**HABITAT REQUIREMENTS:** Dense, moist woodland and riparian thickets at higher elevations, boggy, montane thickets and edges of meadows. Generally nests on the ground, occasionally low in vine tangle or shrub.

**FEEDING:** Consumes primarily insects but also takes a few berries. Forages by gleaning from foliage and twigs, sometimes hovering to glean, and by hawking flying insects.

**STATUS AND MANAGEMENT:** Idaho populations exhibit a sharply and significantly declining trend, while Montana numbers also appear to be declining. In the west as a whole, however, numbers appear to be relatively stable, as is the case for the continent-wide trend, as well, although numbers have declined in the most recent survey years. An uncommon cowbird host.

**FURTHER READING:** Morrison, 1981; Raley and Anderson, 1990; Stewart et al., 1977.



# YELLOW-BREASTED CHAT

*Icteria virens*

Parulinae

Summer Resident

WINTERING AREA: 4

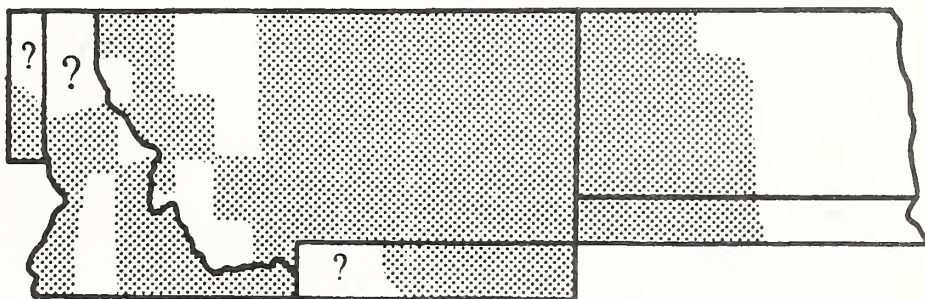
**HABITAT REQUIREMENTS:** Riparian thickets, second growth and scrub along swamp margins, dense shrub thickets and mountain mahogany woodlands on moist slopes. Nests in dense shrub.

**FEEDING:** Takes nearly equal proportions of insects and berries. Forages by gleaning from foliage within vegetation.

**STATUS AND MANAGEMENT:** Numbers have increased significantly in Idaho, declined slightly in

Montana, and increased slightly in North Dakota. Western populations overall exhibit slight increase, while the pattern continent-wide is one of slight decrease with strong, significant decreases in the most recent survey years. Frequently parasitized by cowbirds.

**FURTHER READING:** Ritchison, 1988; Thompson, 1977; Thompson and Nolan, 1973.





# SCARLET TANAGER

*Piranga olivacea*

Thraupinae

Summer Resident

WINTERING AREA: 1

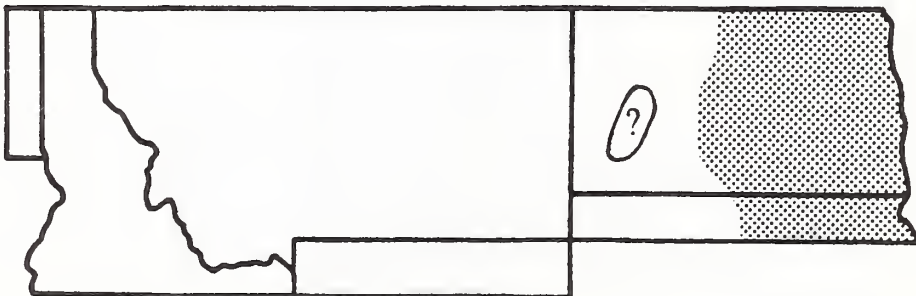
**HABITAT REQUIREMENTS:** Mature deciduous forest of floodplains and upland slopes. Nests in deciduous trees.

**FEEDING:** Insects, spiders, berries and other fruits. Forages most frequently by gleaning from foliage while hovering, also gleans from foliage and bark while moving through trees, and hawks flying insects (more frequently by females than by males).

**STATUS AND MANAGEMENT:** North Dakota is the westernmost edge of the breeding range but

Scarlet Tanagers do not appear in the region's BBS database. Continent-wide, numbers have been fairly stable although steep, significant declines occurred in the most recent survey years. A relatively small wintering range translates into high vulnerability to tropical deforestation (Morton, 1992). Common cowbird host.

**FURTHER READING:** Holmes, 1986; Shy, 1984; Villard et al., 1992.



# WESTERN TANAGER

*Piranga ludoviciana*  
Thraupinae

Summer Resident

WINTERING AREA: 3

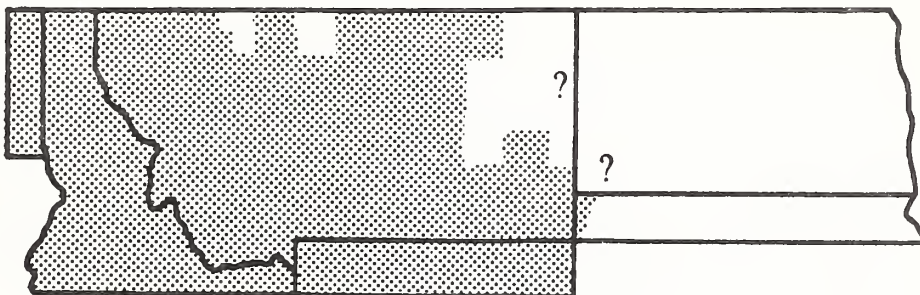
**HABITAT REQUIREMENTS:** Montane coniferous forests and woodlands, riparian woodlands, aspen groves (preferably mixed with conifers (Scott and Crouch, 1988b)), mountain mahogany woodland.

**FEEDING:** Insects, fruits, and buds taken by gleaning from foliage in trees and by hawking flying insects.

**STATUS AND MANAGEMENT:** Numbers are declining significantly both in Idaho and in Montana. In the West as a whole and in the North American

range overall there is a slight declining trend. Generally more abundant in old growth Douglas-fir/ponderosa pine than in rotation-age forest (Hejl and Woods, 1991; Hejl et al., in preparation). Responds positively to controlled burning of ponderosa pine forest or woodland (Bock and Bock, 1983). Rare cowbird host. In spite of being widespread in western North America, the breeding biology and ecology of Western Tanagers has been little studied.

**FURTHER READING:** Hejl et al., 1988.



# LAZULI BUNTING

*Passerina amoena*  
Cardinalinae

Summer Resident

WINTERING AREA: 5

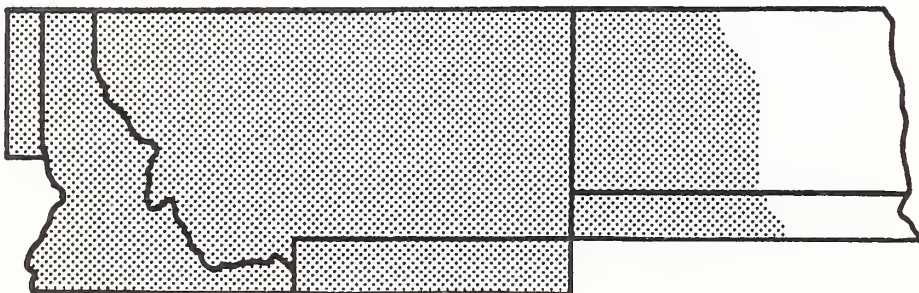
**HABITAT REQUIREMENTS:** Riparian thickets and woodlands, brush-filled canyons, aspen woodland; often found near water. Nests in shrubs or tangled undergrowth.

**FEEDING:** Diet comprised of insects and seeds collected by foraging on the ground and by gleaning from foliage in trees and shrubs.

**STATUS AND MANAGEMENT:** Numbers appear to be increasing in Idaho and North Dakota but decreasing slightly in Montana. Numbers in the west overall appear to be stable with slight

widespread increases reported in the most recent survey year. Numbers increased greatly this century with the creation of extensive areas of early successional habitat in the wake of logging operations and with the increase of riparian thickets in arid and semi-arid regions resulting from the creation of agricultural irrigation systems. Range now appears to have contracted in the face of increased development and suburbanization in parts of the west. Uncommon cowbird host.

**FURTHER READING:** Emlen et al., 1975; Young, 1991.



# INDIGO BUNTING

*Passerina cyanea*  
Cardinalinae

Summer Resident

WINTERING AREA: 3

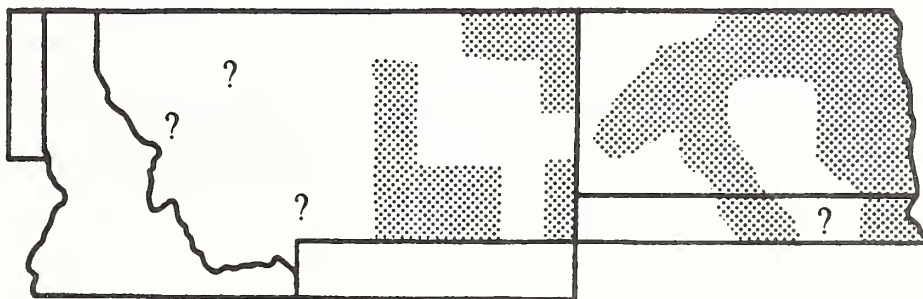
**HABITAT REQUIREMENTS:** Open, upland and floodplain deciduous forest and woodland, including riparian thickets and second growth. Nests usually in deciduous trees or shrubs, occasionally in tangled undergrowth.

**FEEDING:** Consumes insects, seeds (including waste grain), berries and other small fruits. Forages primarily by gleaning from foliage but also feeds on the ground.

**STATUS AND MANAGEMENT:** Numbers show significant increases in North Dakota, and a trend of

increasing numbers overall in the west as Indigo Buntings have expanded their range westward. Continent-wide, however, numbers are declining with significant widespread decreases in the most recent survey years. Abundance increased this century in response to creation of favored, early successional habitats resulting from logging operations and abandonment of pastures. Frequent cowbird host.

**FURTHER READING:** Carey and Nolan, 1979; Emlen et al., 1975; Payne and Payne, 1990; Westneat, 1988, 1989.





# DICKCISSEL

*Spiza americana*  
Cardinalinae

Summer Resident

WINTERING AREA: 3

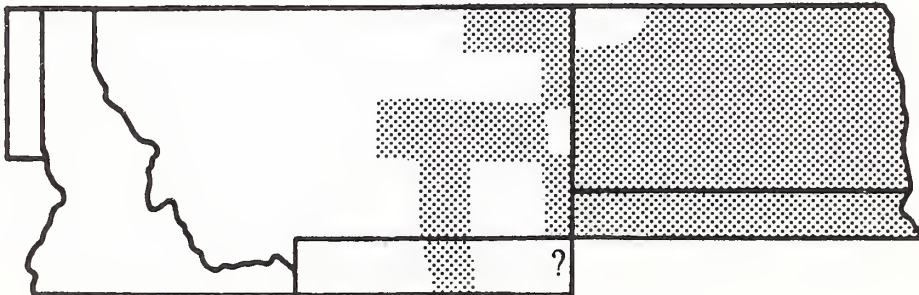
**HABITAT REQUIREMENTS:** Meadows, weedy croplands, alfalfa hayfields, ungrazed native prairie and other grasslands with scattered shrubs. Nests above ground by interweaving nest with live forbs.

**FEEDING:** Adults consume mostly insects, approximately a third of diet comprised of grain, grass, and forb seeds; diet of young birds is the reverse of adult diet. Forages on the ground, gleaning items from the substrate

**STATUS AND MANAGEMENT:** Populations have undergone a sustained, significant decline in North

Dakota and in their entire range overall. Populations are inherently unstable with pronounced fluctuations in local numbers between years being the rule, rather than the exception. Mowing machines in alfalfa and clover fields destroy nests and nestlings. Frequent cowbird host. Dickcissels roost in large flocks following breeding.

**FURTHER READING:** Fretwell, 1986; Harmeson, 1974; Zimmerman, 1982.



# ROSE-BREASTED GROSBEAK

*Pheucticus ludovicianus*

Cardinalinae

Summer Resident

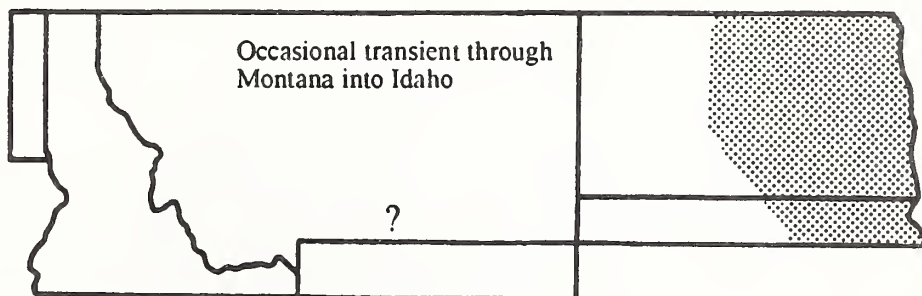
WINTERING AREA: 3

**HABITAT REQUIREMENTS:** Open, upland and floodplain deciduous forest and woodland, including riparian thickets, second growth. Nests usually in deciduous trees, less commonly in shrubs.

**FEEDING:** Takes insects, seeds, fruits, buds, and flowers generally by gleaning from foliage within trees and shrubs (occasionally on the ground), hovering to glean vegetation or bark, and hawking flying insects.

**STATUS AND MANAGEMENT:** Regional BBS data for this species are lacking, as are western data for this eastern species. For eastern North America as a whole, populations appear stable, although there are widespread significant declines in the most recent survey years. Common cowbird host.

**FURTHER READING:** Dunham, 1966; Holmes, 1986; Kroodsma, 1974.



# BLACK-HEADED GROSBEAK

*Pheucticus melanocephalus*  
Cardinalinae

Summer Resident



WINTERING AREA: 5

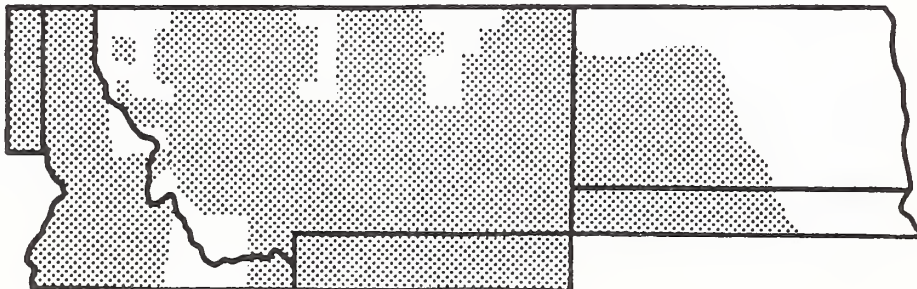
**HABITAT REQUIREMENTS:** Riparian woodland and thickets, open deciduous woodland with well developed shrub layer, deciduous tree and shrub borders of ponds and lakes, aspen groves. Nests in deciduous tree, less frequently in shrub.

**FEEDING:** Takes insects and spiders, seeds, fruits, occasionally including buds. Forages by gleaning from foliage as it moves through trees and shrubs.

**STATUS AND MANAGEMENT:** Numbers are somewhat erratic in Idaho but appear to be declining

rather sharply there while increasing slightly in Montana and North Dakota. In the western range overall there is a slight declining trend for this western species, although numbers have increased significantly in some portions of the range in the most recent survey year. Uncommon cowbird host.

**FURTHER READING:** Hill, 1988; Kroodsmma, 1974.



# GREEN-TAILED TOWHEE

*Pipilo chlorurus*

Emberizinae

Summer Resident

WINTERING AREA: 5

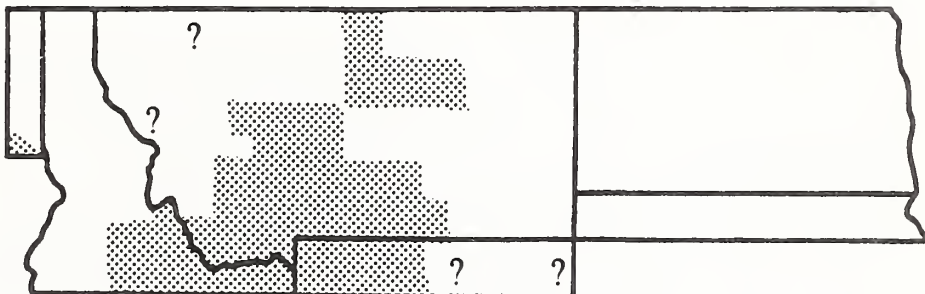
**HABITAT REQUIREMENTS:** Brushy montane slopes, shrubsteppe, riparian scrub. Nests low in shrub, sometimes on the ground beneath low, dense shrub.

**FEEDING:** Diet of insects, grass and forb seeds, and berries is acquired primarily by scratching in leaf litter on the ground, usually beneath dense shrub-cover.

**STATUS AND MANAGEMENT:** Declining slightly in (southern) Idaho but significantly declining in

Montana, although sample sizes are rather small. The overall trend in the range as a whole is one of relative stability. Preferred habitats contain a mixture of shrub species, almost invariably including mountain mahogany (Knopf et al., 1990). Uncommon cowbird host. Breeding biology has been little studied.

**FURTHER READING:** Morton, 1991.





# RUFOUS-SIDED TOWHEE

*Pipilo erythrophthalmus*

Emberizinae

Summer Resident for the most part, occasionally a Permanent Resident from westernmost Montana westward and in scattered parts of North Dakota

WINTERING AREA: 6

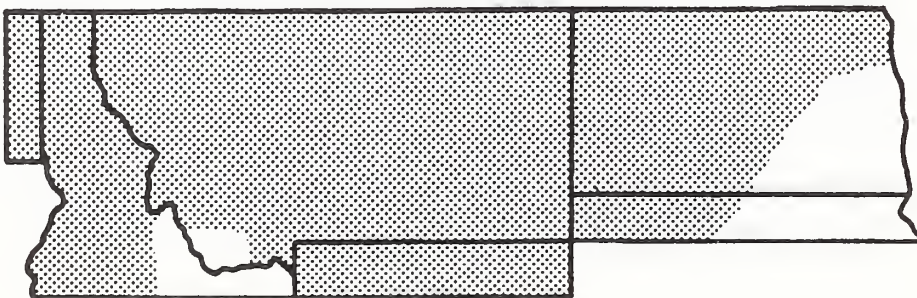
**HABITAT REQUIREMENTS:** Montane shrub-covered slopes and dense shrub undergrowth of riparian thickets, deciduous or coniferous forest edge, second-growth, and open woodlands. Nests usually on the ground in slight depression beneath shrub, occasionally in low shrub.

**FEEDING:** Typically forages on the ground by scratching in leaf litter for insects and other terrestrial invertebrates, also gleans from foliage in shrubs and undergrowth, taking seeds of grasses and forbs as well as small fruits.

**STATUS AND MANAGEMENT:** Idaho populations have undergone a highly significant, steep decline,

while numbers in Montana appear to be increasing and North Dakota populations appear stable. Western populations overall appear stable or slightly increasing, while numbers continent-wide show a significant declining trend with widespread significant declines in the most recent survey years. May exhibit strong site tenacity leading to sustained loss of local populations in response to habitat perturbation, whether natural (e.g., flooding) or human-induced (e.g., clearcutting) (Knopf and Sedgwick, 1987). Frequent cowbird host.

**FURTHER READING:** Greenlaw, 1978; Yahner, 1991.



# CHIPPING SPARROW

*Spizella passerina*

Emberizinae

Summer Resident, rarely a Winter Resident in westernmost Montana

WINTERING AREA: 5

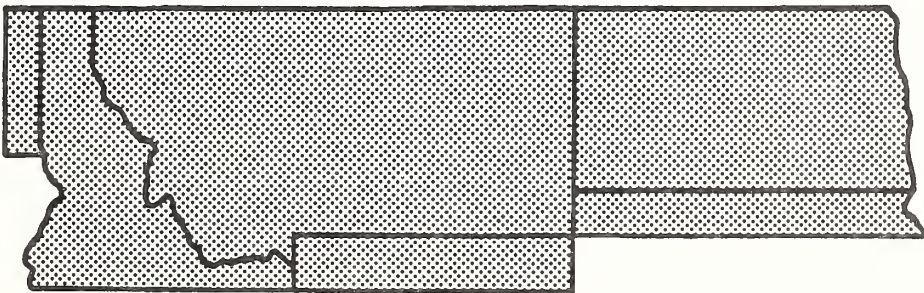
**HABITAT REQUIREMENTS:** Open forests and woodlands of all types, montane scrub, partially wooded areas around human habitations. Generally nests low in trees, sometimes in tangled undergrowth and rarely on the ground in well concealed locale.

**FEEDING:** Mostly insects and spiders but also takes seeds of grasses and forbs. Forages primarily on the ground, but often gleans from foliage in trees and shrubs and occasionally hawks flying insects.

**STATUS AND MANAGEMENT:** Significant population declines are occurring in Idaho and Montana in contrast to a significant increasing trend in North Dakota. The overall trend for western populations is one of significant decline, but considering the species continent-wide numbers appear stable overall with widely scattered significant

increases and decreases seen in the most recent survey years. Affinity for open woodland generally enables Chipping Sparrows to occupy disturbed successional habitats following logging operations. Responds positively to controlled burns in ponderosa pine woodland (Bock and Bock, 1983). Chipping Sparrows appear to be most abundant in the oldest rotation-age stands of mixed-conifer forest (Hejl and Woods, 1991; Mannan and Meslow, 1984; Tobalske et al., 1991); increasing timber harvest at younger age-classes may be an important factor in the sparrow's general decline in the west. Frequent cowbird host.

**FURTHER READING:** Benkman and Pulliam, 1988; Buech, 1982; Dawson et al., 1979; Graham, 1988; Hebrard, 1978.



# CLAY-COLORED SPARROW

*Spizella pallida*  
Emberizinae

Summer Resident

WINTERING AREA: 5

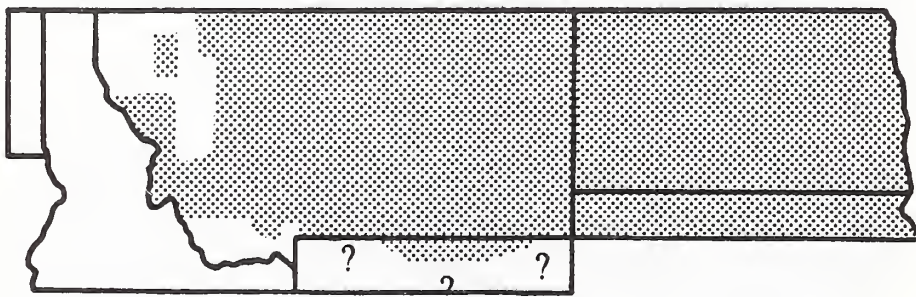
**HABITAT REQUIREMENTS:** Riparian and prairie thickets, grasslands with scattered shrubs or small trees, riparian woodland, brushy woodland margins, early successional stages following logging operations or fire, shelterbelts, abandoned cultivated fields. Generally nests low in shrub, occasionally on the ground beneath shrub.

**FEEDING:** Takes insects and seeds of grasses and forbs, also buds and catkins in spring. Forages primarily on the ground.

**STATUS AND MANAGEMENT:** Numbers are declining in Montana, strongly and significantly

declining in North Dakota, including significant declines in the most recent survey years. Populations are declining significantly throughout the species western range overall, as well as throughout its continental range as a whole. The Clay-colored Sparrow is a northern Great Plains endemic whose breeding range has extended east and north since the turn of the century as logging created abundant early successional habitats. Common cowbird host.

**FURTHER READING:** Buech, 1982; Knapton, 1978.





# BREWER'S SPARROW

*Spizella breweri*

Emberizinae

Summer Resident

WINTERING AREA: 5

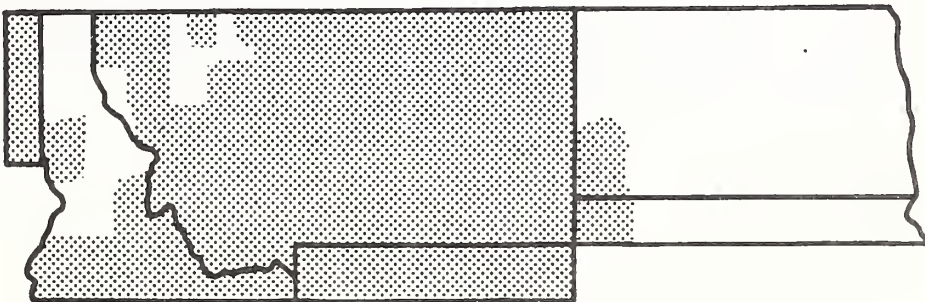
**HABITAT REQUIREMENTS:** Shrubsteppe, shortgrass prairie with scattered to abundant shrubs (especially sagebrush), montane thickets and shrub-covered slopes. Nests in low shrub, usually sagebrush.

**FEEDING:** Takes insects, spiders, and seeds of grasses and forbs. Forages by gleaning items from the ground and by gleaning from shrub foliage as it moves through them.

**STATUS AND MANAGEMENT:** Numbers are declining steeply and significantly in Idaho and declining in Montana but BBS data for North Dakota are lacking. Considering the western range overall, there appears to be a steady declining trend and a significant declining trend for the overall North

American range, with significant declines in the central Rockies in the most recent survey years. Brewer's Sparrow is the dominant avian species associated with sagebrush habitats. Herbicidal treatment of sagebrush results in diet shift to greater proportion of seeds and a significant reduction in numbers of nesting birds in the season of spraying (Best, 1972) and complete habitat abandonment in subsequent breeding seasons (Schroeder and Sturges, 1975). Uncommon cowbird host. Many details of breeding biology are still relatively unknown.

**FURTHER READING:** Knopf et al., 1990; Petersen and Best, 1987; Reynolds, 1981; Rotenberry and Wiens, 1989; Short, 1984; Wiens et al., 1986, 1987, 1990.





# VESPER SPARROW

*Pooecetes gramineus*  
Emberizinae

Summer Resident

WINTERING AREA: 5

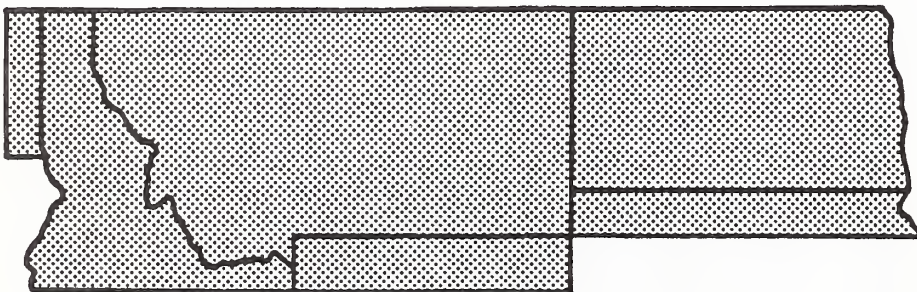
**HABITAT REQUIREMENTS:** Generally at lower elevations in drier grasslands with scattered shrubs, prairie edge, abandoned fields, margins of shelterbelts. Nests in depression on the ground, usually well concealed.

**FEEDING:** Diet comprised of approximately equal proportions of insects and seeds of grasses and forbs. Forages on the ground.

**STATUS AND MANAGEMENT:** Numbers are increasing modestly in Idaho, declining in Montana,

and significantly increasing in North Dakota. Western populations overall exhibit a slight declining trend, as is the case continent-wide, with significant recent decreases outnumbering increases in widely scattered parts of the range. Nests in croplands are frequently destroyed by agricultural operations. Common cowbird host.

**FURTHER READING:** Best and Rodenhouse, 1984; Perritt and Best, 1989; Wray and Whitmore, 1979.



# LARK SPARROW

*Chondestes grammacus*

Emberizinae

Summer Resident

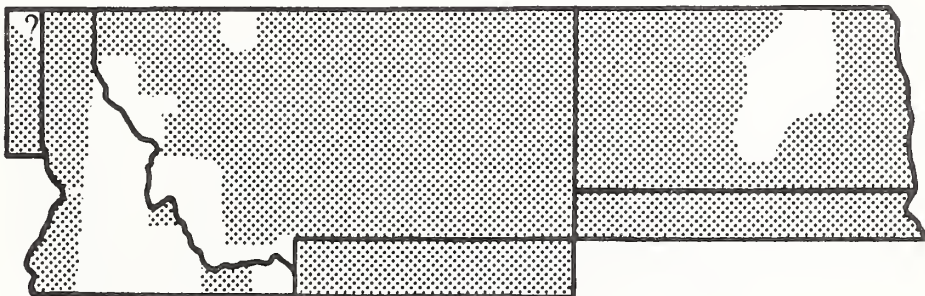
WINTERING AREA: 5

**HABITAT REQUIREMENTS:** Mostly at lower elevations in prairie, often associated with farmlands or grasslands with scattered shrubs; also woodland margins and thickets adjoining grasslands or fields, agricultural areas with scattered trees and shrubs, and open woodland. Nests generally placed on the ground in slight depression, but also will nest low in shrub and sometimes in a rocky niche; known to reuse nests of other species as well as its own.

**FEEDING:** Diet comprised largely of grass and forb seeds but also includes insects.

**STATUS AND MANAGEMENT:** Numbers appear to be increasing in Idaho, significantly increasing in Montana, and declining slightly in North Dakota. Western populations overall appear to be declining slightly, while continent-wide there is a significant declining trend. Occasional cowbird host.

**FURTHER READING:** McNair, 1984; Newman, 1970.



# SAGE SPARROW

*Amphispiza belli*  
Emberizinae

Summer Resident

WINTERING AREA: 5

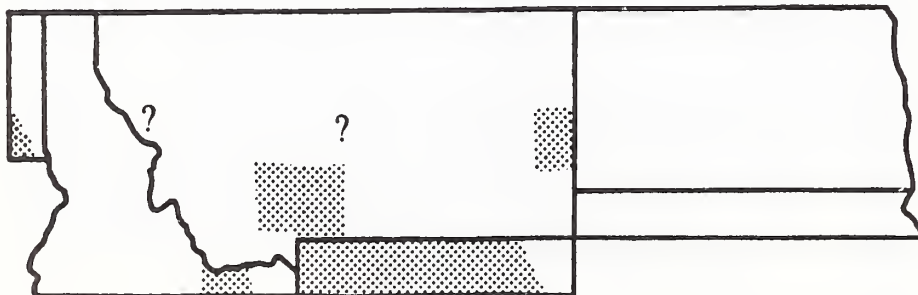
**HABITAT REQUIREMENTS:** Shrubsteppe, especially sagebrush dominated. Nest usually placed in sagebrush, occasionally on ground beneath sagebrush.

**FEEDING:** Primarily insects and spiders but also includes some seeds. Forages on the ground and commonly gleans from foliage inside shrubs.

**STATUS AND MANAGEMENT:** Numbers appear to be declining in Idaho but sample sizes are very small; does not appear in BBS database for Montana.

Sage Sparrows exhibit a declining trend for their range overall. Males exhibit strong site tenacity to breeding territory, even if sagebrush habitat is altered by removal of shrub cover or by burning (Wiens et al., 1986). Uncommon cowbird host.

**FURTHER READING:** Johnson and Marten, 1992; Petersen and Best, 1987; Reynolds, 1981; Rotenberry and Wiens, 1989; Wiens et al., 1987, 1990.



# SAVANNAH SPARROW

*Passerculus sandwichensis*

Emberizinae

Summer Resident

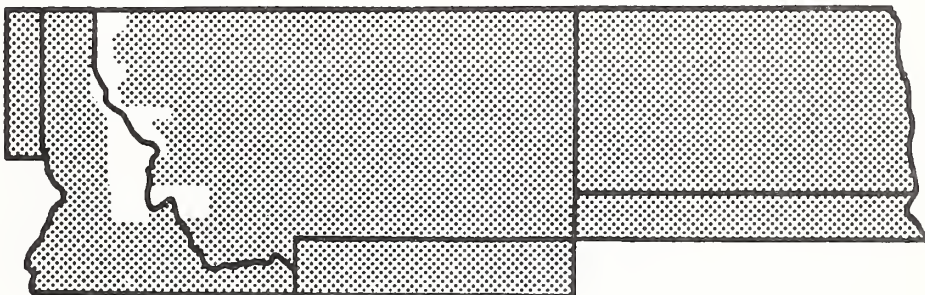
WINTERING AREA: 4

**HABITAT REQUIREMENTS:** Moist shortgrass prairie, wet meadows from low elevations to subalpine, ungrazed or lightly grazed mixed- or tallgrass prairie, hayfields, weedy croplands, and stubble fields. Nests on the ground in slight depression, well concealed by overhanging vegetation.

**FEEDING:** Diet comprised of insects, spiders, and other small invertebrates, as well as grass seeds. Forages on the ground, picking items from the substrate.

**STATUS AND MANAGEMENT:** Numbers are apparently increasing in Idaho but steadily declining in Montana and North Dakota. In the west as a whole, however, populations exhibit a significantly increasing trend, in contrast to a slight declining trend when viewed on a continent-wide basis, with widely scattered significant declines in the most recent survey year. Uncommon cowbird host.

**FURTHER READING:** Bedard and LaPointe, 1985; Bedard and Meunier, 1983; Rising, 1988; Watts, 1991; Weatherhead, 1979; Williams, 1987.





# LARK BUNTING

*Calamospiza melanocorys*  
Emberizinae

Summer Resident

WINTERING AREA: 5

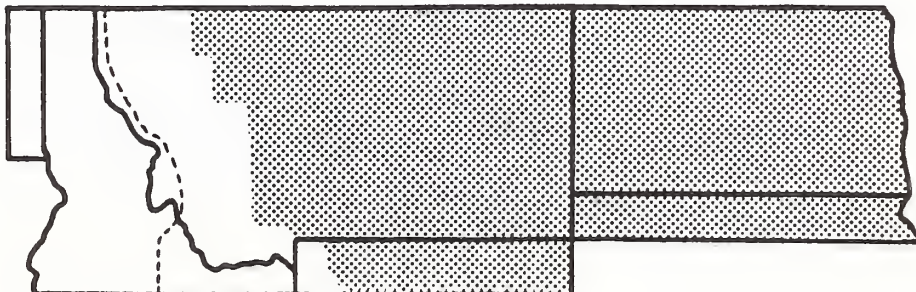
**HABITAT REQUIREMENTS:** Prairies and other grasslands including especially those with scattered sagebrush or other low shrubs, shrubsteppe, abandoned croplands, hayfields (especially alfalfa), occasionally in stubble fields. Nests on the ground in slight depression, often at base of shrub or forb.

**FEEDING:** Consumes insects primarily (especially grasshoppers), also takes seeds of grasses, sedges, and forbs. Forages on the ground, picking items from the substrate, occasionally hawks flying insects.

**STATUS AND MANAGEMENT:** Numbers appear to be increasing in Montana but steeply and significantly declining in North Dakota, although numbers there increased significantly in the most

recent survey year. Apparently declining in its western range overall but numbers have fluctuated greatly over the period of BBS survey years; significantly declining for North American range as a whole. Destruction and fragmentation of native prairie grasslands in eastern and northeastern portion of historic range has led to contraction of range. Heavy grazing in shortgrass prairie habitats decreases suitability for nesting and can cause a decline in population density (Finch et al., 1987). Uncommon cowbird host.

**FURTHER READING:** Creighton, 1974; Pleszczyńska, 1978; Pleszczyńska and Hansell, 1980; Wunder, 1979.



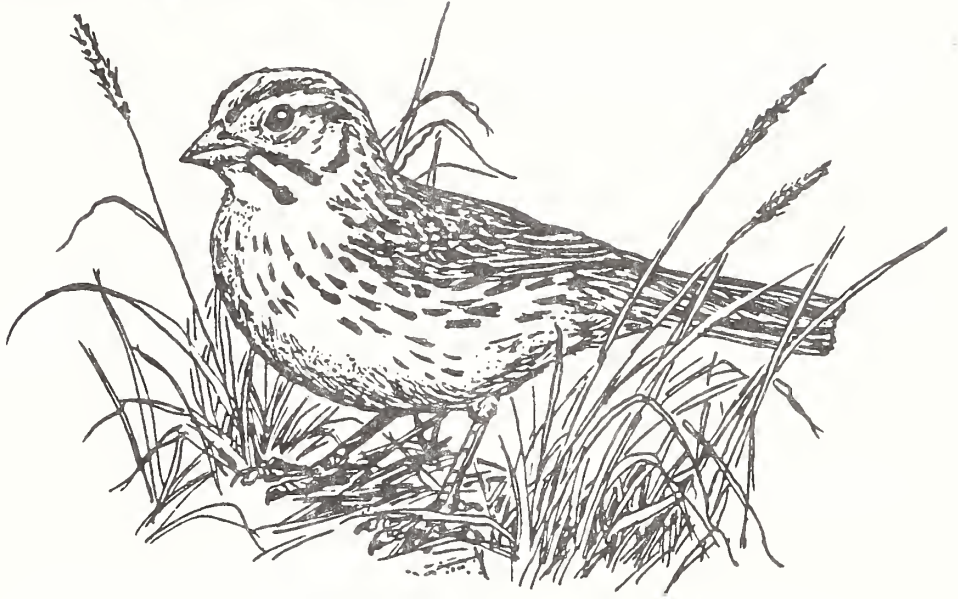
Transient westward to dotted line

# BAIRD'S SPARROW

*Ammodramus bairdii*  
Emberizinae

Summer Resident

WINTERING AREA: 5



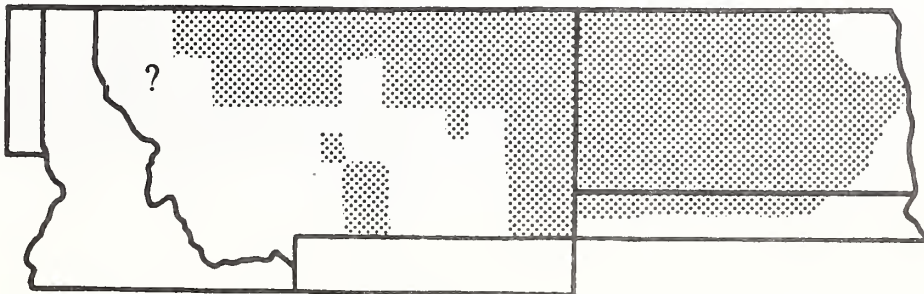
**HABITAT REQUIREMENTS:** A shortgrass prairie specialist endemic to the northern Great Plains; to a lesser extent also will use mixed tallgrass-shortgrass prairie, alfalfa fields, weedy stubble fields, and retired cropland. Nests on the ground in slight depression, usually well concealed by overhanging vegetation.

**FEEDING:** Consumes primarily insects and spiders, also takes seeds of grasses and forbs. All foraging is done on the ground.

**STATUS AND MANAGEMENT:** Declining steeply and significantly in Montana, and declining at a somewhat lesser pace in North Dakota; numbers are steadily declining throughout the species range.

Listed as a Threatened Species in Canada. Apparently Baird's Sparrows do tolerate very light grazing regimens (Kantrud and Kologiski, 1982) and prefer grasslands having little or no shrub cover. Densities on native grasslands have been found to be seven times greater than densities in cultivated grasslands and significantly more territories occurred in undisturbed grasslands than in grazed areas (Owens and Myres, 1973). Loss of suitable native prairie due to livestock grazing and agricultural conversion have caused inexorable decline in Baird's Sparrow populations throughout their range. Uncommon cowbird host.

**FURTHER READING:** Smith, 1987; Sousa and McDonal, 1983.



# GRASSHOPPER SPARROW

*Ammodramus savannarum*  
Emberizinae

Summer Resident

WINTERING AREA: 4

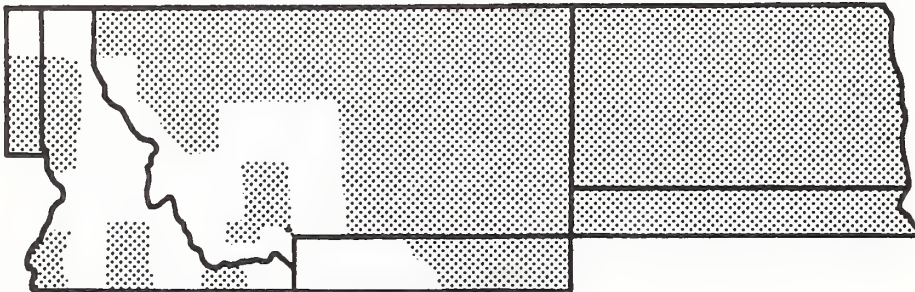
**HABITAT REQUIREMENTS:** Grasslands of all sorts at lower elevations: native prairie, early successional stages of abandoned agricultural fields, agricultural stubble fields, hayfields. Nests on the ground in slight depression in dense herbaceous vegetation.

**FEEDING:** Diet comprised mostly of insects (especially grasshoppers) and other terrestrial invertebrates, also grass and forb seeds. Forages on the ground.

**STATUS AND MANAGEMENT:** Numbers are declining throughout the region, most sharply and significantly in North Dakota. The pattern seen in

the west as a whole is one of small but steady decline, whereas continent-wide the decline has been significant and of greater magnitude, driven by relatively steeper declines in many parts of the eastern U.S. Numbers typically fluctuate locally between years. Nests in cultivated grasslands and hayfields suffer high losses from mowing. Prefers ungrazed or lightly grazed prairie, occurring only sparingly in more heavily grazed grasslands (Stewart, 1975). Conversion of native prairie to agriculture has been linked to declines in the northern Great Plains. Uncommon cowbird host.

**FURTHER READING:** Joern, 1988; Wiens, 1973.



# FOX SPARROW

*Passerella iliaca*

Emberizinae

Summer Resident, rarely a Winter Resident in north-central Montana and western Idaho

WINTERING AREA: 5

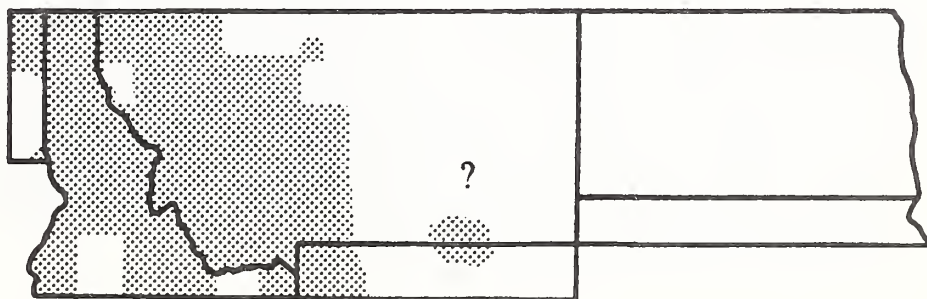
**HABITAT REQUIREMENTS:** Brushy forest edge, montane thickets, riparian thickets, brushy montane slopes. Nests usually placed on ground beneath shrub and occasionally low in shrub.

**FEEDING:** Diet comprised of insects, spiders, and other terrestrial invertebrates acquired by foraging on the ground, usually scratching in leaf litter beneath shrubs or brush; also consumes seeds, berries, and buds.

**STATUS AND MANAGEMENT:** Sample sizes from BBS routes in the region are small but indicate

relative stability in numbers in Idaho and Montana. Western populations overall exhibit a modest increasing trend; no continent-wide trend can be assessed as BBS routes are lacking in the Fox Sparrow's northern Canadian breeding range. Uncommon cowbird host.

**FURTHER READING:** Hejl et al., 1988; Threlfall and Blacchiere, 1982; Zink, 1986.





# SONG SPARROW

*Melospiza melodia*

Emberizinae

Permanent Resident in western portion of region,  
primarily a Summer Resident from central Montana  
eastward

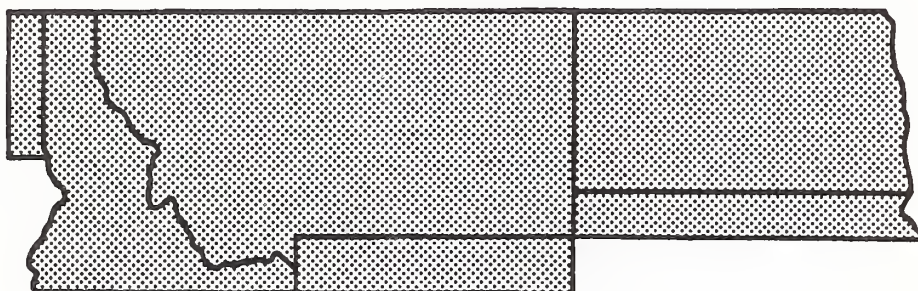
WINTERING AREA: 6

**HABITAT REQUIREMENTS:** Shrub thickets and dense brush in or near open forest or woodland, prairie thickets, riparian thickets, shrubby fringes of ponds and lakes, shelterbelts, brushy areas in vicinity of human habitations. Nests on ground beneath shrubs or in brush, as well as above ground in low shrub.

**FEEDING:** Consumes primarily insects, occasionally including other terrestrial invertebrates, also seeds of grasses and forbs, a few berries. Most often forages on the ground, gleaning items from the substrate but also gleans from foliage close to the ground.

**STATUS AND MANAGEMENT:** Populations undergoing sustained, significant decline in Idaho and North Dakota, and declining as well in Montana. Western populations overall exhibit a significant declining trend, as is also the pattern continent-wide. Along with Yellow Warblers, Song Sparrows are the most frequent targets of cowbird parasitism.

**FURTHER READING:** Arcese, 1989; Graham, 1988; Hochachka, 1990; Smith and Merkt, 1980; Smith et al., 1982; Stoddard et al., 1990.



# LINCOLN'S SPARROW

*Melospiza lincolnii*

Emberizinae

Summer Resident

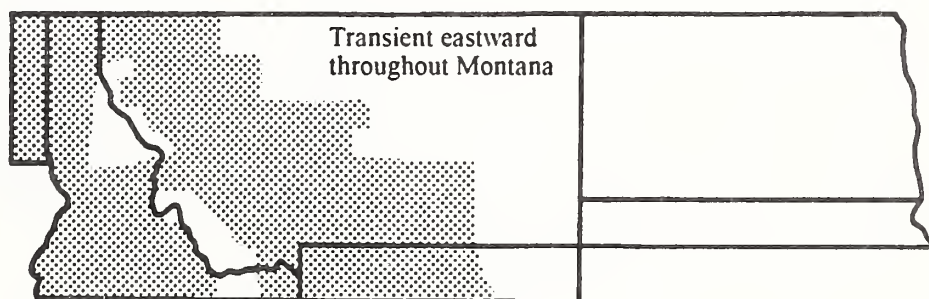
WINTERING AREA: 4

**HABITAT REQUIREMENTS:** Montane bogs and wet meadows, willow thickets; aspen forest with shrub understory. Nests on the ground.

**FEEDING:** Consumes insects, spiders, and other terrestrial invertebrates, and the seeds of grasses and forbs. Forages primarily on the ground but also gleans from foliage within shrubs.

**STATUS AND MANAGEMENT:** Numbers are increasing in Idaho and significantly increasing in Montana. A significantly increasing trend characterizes Western populations as a whole, as well as the continent-wide pattern. Rare cowbird host.

**FURTHER READING:** Finch and Reynolds, 1988; Raley and Anderson, 1990.



# SWAMP SPARROW

*Melospiza georgiana*  
Emberizinae

Summer Resident

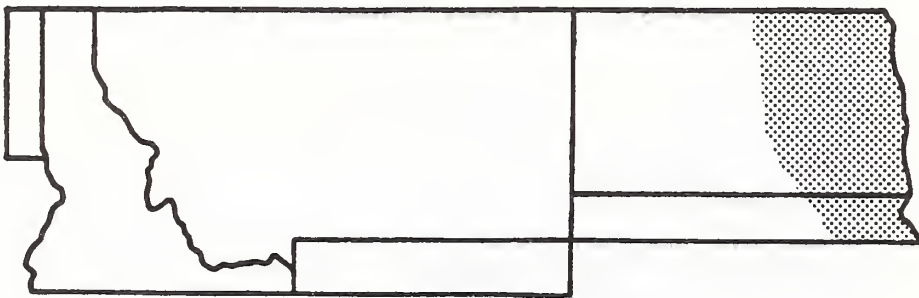
WINTERING AREA: 5

**HABITAT REQUIREMENTS:** Alkaline bogs and other freshwater habitats with emergent cattails or phragmites and scattered shrubs. Nests in shrub or emergent vegetation, often over shallow water, less commonly on the ground.

**FEEDING:** Takes terrestrial and aquatic insects, and seeds of grasses, forbs, and sedges. Forages on the ground, sometimes wades in shallow water.

**STATUS AND MANAGEMENT:** Populations in the region represent the northwestern edge of the species U.S. breeding range, are highly localized, and do not appear in the regional BBS database. Continent-wide trend appears to be one of slightly increasing numbers. Common cowbird host.

**FURTHER READING:** Greenberg, 1988; Greenberg and Droege, 1990.



# WHITE-CROWNED SPARROW

*Zonotrichia leucophrys*  
Emberizinae

Summer Resident, occasionally Permanent Resident  
in westernmost portion of region

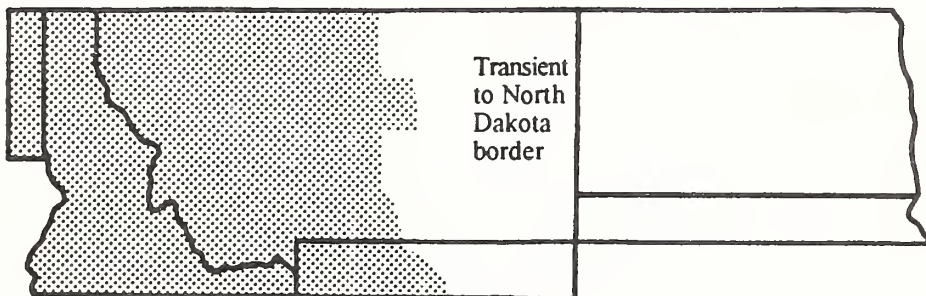
WINTERING AREA: 5

**HABITAT REQUIREMENTS:** Open coniferous forest with well-developed shrub understory, riparian thickets, aspen groves with shrubby understory, montane meadows with shrub thickets. Nests in shrubs or, less commonly, on ground beneath them.

**FEEDING:** Insects and spiders, seeds of grasses and forbs, berries and other small fruits, moss capsules and other greens. Forages mostly by gleaning from the ground but also gleans from foliage in shrubs and low trees, occasionally hawks flying insects.

**STATUS AND MANAGEMENT:** Populations appear to be declining in Idaho and Montana but numbers have fluctuated greatly. Both in the west as a whole and continent-wide, populations have undergone a sustained, significant declining trend. Uncommon cowbird host.

**FURTHER READING:** Benkman and Pulliam, 1988; King and Hubbard, 1981; Morton, 1992; Petrinovich and Patterson, 1983.





# DARK-EYED JUNCO

*Junco hyemalis*

Emberizinae

Mostly a Permanent Resident from Montana westward and Winter Resident in North Dakota

WINTERING AREA: 6

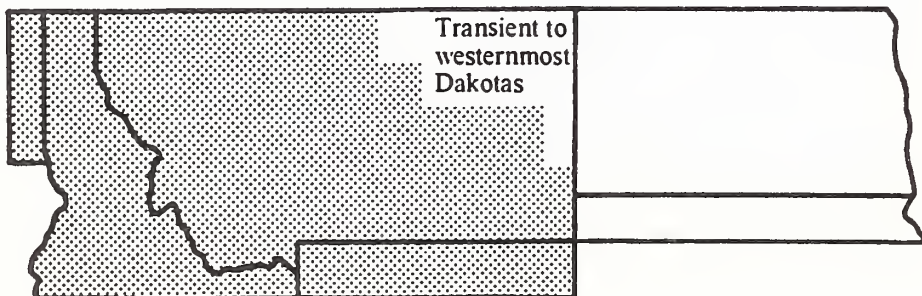
**HABITAT REQUIREMENTS:** Open coniferous forest (especially ponderosa pine), edge, and woodland (especially pinyon-juniper), mixed coniferous-deciduous woodland, aspen groves, forest clearings, montane brushy fringes of ponds and bogs. Winters widely in open habitats providing shrub or tree cover. Nests on the ground in well protected, shallow depression.

**FEEDING:** Forages mostly on the ground taking a wide variety of seeds and a lesser proportion of insects and spiders; also gleans from low foliage and occasionally hawks flying insects.

**STATUS AND MANAGEMENT:** Numbers declining sharply and significantly in Idaho, including

significant declines in the most recent survey year, but numbers are apparently stable in Montana. Western populations overall appear to be declining only slightly and a similar trend is seen continent-wide. Populations respond positively to retention of logging slash which supplies cover, foraging and nesting sites (Tobalske et al., 1991). Juncos also respond positively to controlled burns in ponderosa pine woodlands (Bock and Bock, 1983). Uncommon cowbird host.

**FURTHER READING:** Benkman and Pulliam, 1988; Chandler and Mulvihill, 1992; Hejl et al., 1988; Holmes and Robinson, 1988; Nolan and Ketterson, 1990; Smith and Andersen, 1982; Swanson, 1991; Wolf et al., 1991.



# McCOWN'S LONGSPUR

*Calcarius mccownii*  
Emberizinae

Summer Resident

WINTERING AREA: 5



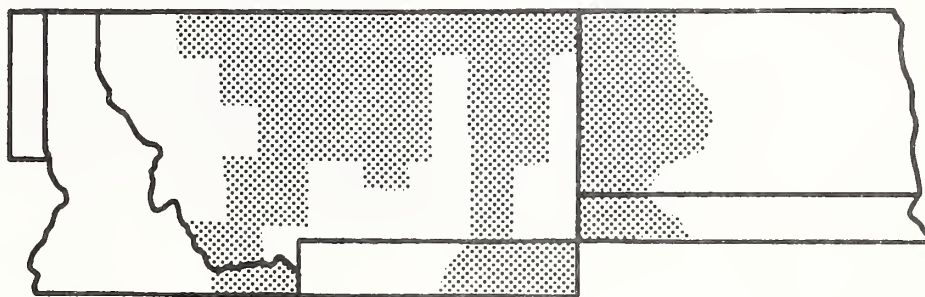
**HABITAT REQUIREMENTS:** Native shortgrass prairie, moderately to heavily grazed mixed-grass prairie, small-grain stubble fields. Nests on the ground in slight depression amid sparse vegetation.

**FEEDING:** Diet comprised mostly of insects (primarily grasshoppers, crickets, and beetles) during the breeding season, but also consumes substantial numbers of grass and forb seeds.

**STATUS AND MANAGEMENT:** Numbers have increased significantly in Montana but North Dakota populations are so small and local that the species

does not appear in the BBS database for the state. Although sample sizes are small, western numbers overall appear to be increasing but numbers have fluctuated greatly. In North Dakota, populations declined drastically and breeding range contracted substantially during the period 1905-1930, coincident with the extensive conversion of native prairie to agricultural land (Stewart, 1975); North Dakota birds now nest primarily in stubble fields. Uncommon cowbird host.

**FURTHER READING:** Greer and Anderson, 1989.



# CHESTNUT-COLLARED LONGSPUR

*Calcarius ornatus*  
Emberizinae

Summer Resident

WINTERING AREA: 5

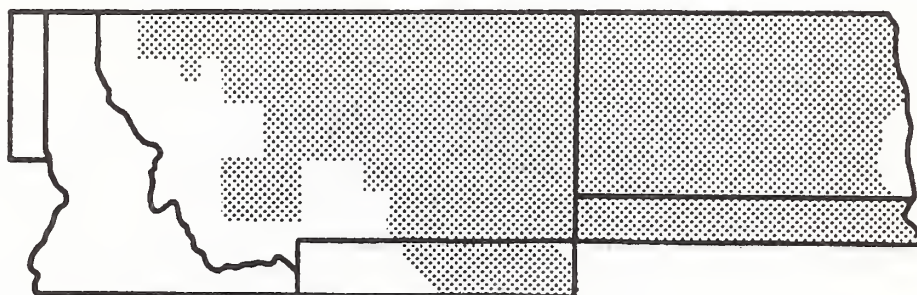
**HABITAT REQUIREMENTS:** Mixed-grass and shortgrass prairie, brackish or subsaline wet meadows adjoining ponds and lakes. Nests on the ground in slight depression amid sparse vegetation.

**FEEDING:** Forages on the ground for insects and spiders, and the seeds of grasses, forbs, and sedges.

**STATUS AND MANAGEMENT:** Numbers show an increasing trend in Montana but a decreasing trend in North Dakota with a significant decrease in the most recent survey year. Western populations overall appear to be increasing slightly but numbers have

fluctuated greatly. Compared to McCown's Longspur, Chestnut-collared prefers prairie grasslands that provide denser cover. Less preferred but acceptable nesting habitats include mowed hayfields and moderate to heavily grazed pastures. Numbers have been reduced greatly by conversion of native prairie habitats to agriculture (Stewart, 1975). Generally considered to be an uncommon cowbird host but may in fact be parasitized rather commonly.

**FURTHER READING:** Fairfield, 1968; Moriarty, 1965.



# BOBOLINK

*Dolichonyx oryzivorus*  
Icterinae

Summer Resident

WINTERING AREA: 1

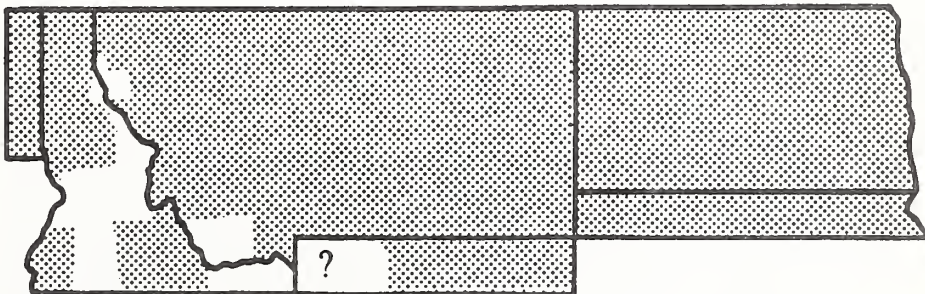
**HABITAT REQUIREMENTS:** Tallgrass prairie, ungrazed or lightly grazed mixed-grass prairie, hayfields, wet meadows, abandoned croplands. Nests are well concealed on the ground in slight depression.

**FEEDING:** Insects and spiders supplemented with seeds of grasses and forbs. Forages on the ground and in low vegetation by gleaning items from the substrate and from foliage.

**STATUS AND MANAGEMENT:** BBS sample sizes are too small to indicate a trend for Idaho; numbers

are significantly declining in Montana but are stable in North Dakota. In the west as a whole, numbers appear to be stable or even increasing, but continent-wide there is a consistent declining trend with scattered significant declines in the most recent survey years in eastern portions of the North American range. Historic range and numbers have been reduced greatly as a result of changing agricultural practices. Uncommon cowbird host.

**FURTHER READING:** Bollinger and Gavin, 1989, 1992a, b; Gavin and Bollinger, 1988; Orians, 1985.





# RED-WINGED BLACKBIRD

*Agelaius phoeniceus*

Icterinae

Summer Resident, occasionally a Winter or Permanent Resident in western portion of region

WINTERING AREA: 6

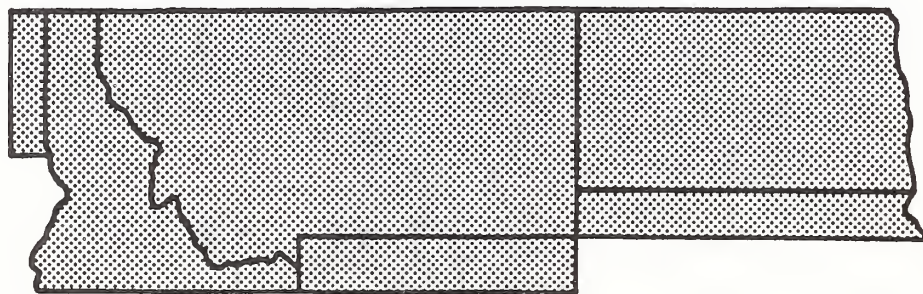
**HABITAT REQUIREMENTS:** Nests in wetlands of all types providing emergent vegetation: freshwater marshes, riparian habitats, wet meadows, ditches, also hayfields and croplands; forages in surrounding upland habitats. Nests in emergent vegetation, usually of reeds, cattails, or shrubs, almost invariably near or over water.

**FEEDING:** Takes insects and spiders, seeds of grasses and forbs, and waste grain. Forages on the ground and at water's edge, gleans from foliage in shrubs and emergent vegetation, hawks flying insects.

**STATUS AND MANAGEMENT:** Numbers are increasing in Idaho but declined significantly in the most recent survey year; numbers are declining significantly in Montana and apparently declining

slightly in North Dakota. In the West as a whole, numbers display a small but consistent increasing trend, while continent-wide there is an overall slight declining trend, with significant overall decline in the most recent survey year. Males often form post-breeding flocks and roost together in flocks even during the summer, generally roosting in wetland areas. Extremely abundant, Red-winged Blackbirds form immense winter flocks with other blackbirds and starlings that have been the targets of occasional control efforts in agricultural and suburban areas. Frequent cowbird host.

**FURTHER READING:** Beletsky and Orians, 1991; Ewald and Rohwer, 1982; Moore and Dolbeer, 1989; Olson, 1991; Orians, 1980, 1985.



# WESTERN MEADOWLARK

*Sturnella neglecta*

Icterinae

Summer Resident, occasionally a Winter or Permanent Resident at lower elevations throughout the region (especially from central Montana westward)

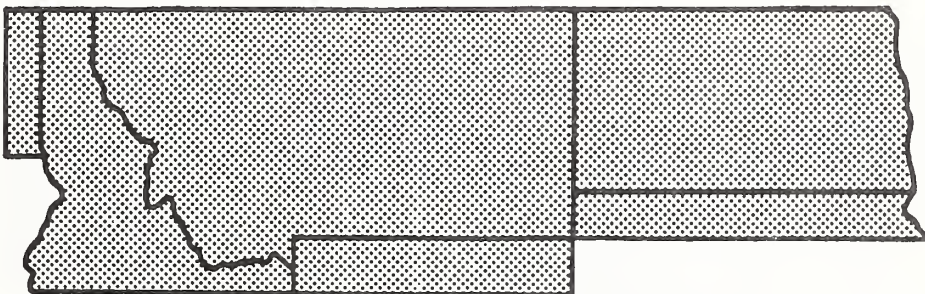
WINTERING AREA: 6

**HABITAT REQUIREMENTS:** Tallgrass and mixed-grass prairie, hayfields, wet meadows, abandoned croplands, more sparsely in shortgrass prairie and prairie with scattered sagebrush or other shrubs, occasionally in lower, montane meadows. Nests are well concealed on the ground in slight depression, often with an interwoven domed canopy.

**FEEDING:** Takes insects, spiders, and other terrestrial invertebrates, also includes seeds of grasses and forbs in diet. Forages on the ground, gleaning items from the substrate.

**STATUS AND MANAGEMENT:** Numbers are increasing modestly in Idaho, declining slightly in Montana, and stable in North Dakota. In the West as a whole, however, numbers are significantly declining in conjunction with an apparent declining trend continent-wide that includes significant declines in many parts of the range in the most recent survey year. Range has expanded to the northeast. Uncommon cowbird host.

**FURTHER READING:** Orians, 1985; Rohwer, 1973; Schaeff and Picman, 1988.



# YELLOW-HEADED BLACKBIRD

*Xanthocephalus xanthocephalus*  
Icterinae

Summer Resident, very rarely a Permanent Resident

WINTERING AREA: 5

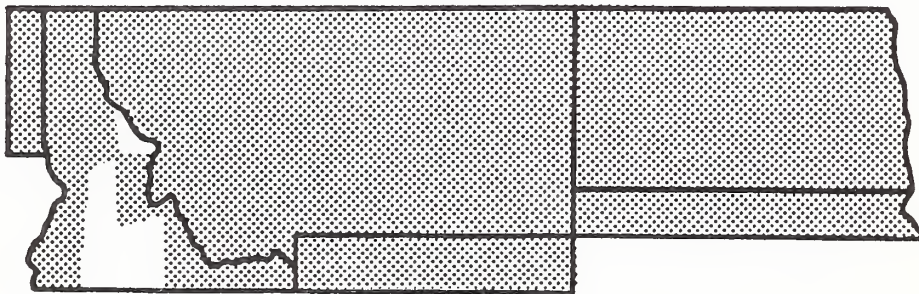
**HABITAT REQUIREMENTS:** Nests in wetlands providing emergent vegetation, generally occupying deeper water areas than the Red-winged Blackbird; forages in surrounding upland habitats but also feeds extensively in wetlands. Nests in emergent vegetation over water.

**FEEDING:** Takes primarily aquatic and terrestrial insects, also spiders and seeds of grasses and forbs. Forages by gleaning items from the ground and at water's edge, hawks flying insects, and also gleans from foliage of emergent vegetation.

**STATUS AND MANAGEMENT:** Numbers are declining in Idaho but increasing significantly in

both Montana and North Dakota, as is also the trend for the West overall and for the continent-wide range, as well. North Dakota populations increased dramatically between 1967 and 1982 (Besser, 1985); although they consume significant amounts of sunflower seeds in commercial crop fields, the economic impact of Yellow-headed Blackbirds is far less than that of the much more numerous Red-winged Blackbirds (Twedt et al., 1991). Roosts in wetlands. Rare cowbird host.

**FURTHER READING:** Beletsky et al., 1990; Bump, 1986; Gori, 1988; Leonard and Picman, 1986; Orians, 1980, 1985; Ortega and Cruz, 1991; Schroeder, 1982b.





# BREWER'S BLACKBIRD

*Euphagus cyanocephalus*

Icterinae

Summer Resident but rarely to occasionally a Permanent Resident in North Dakota, central and southern Montana, and westernmost Idaho

WINTERING AREA: 6

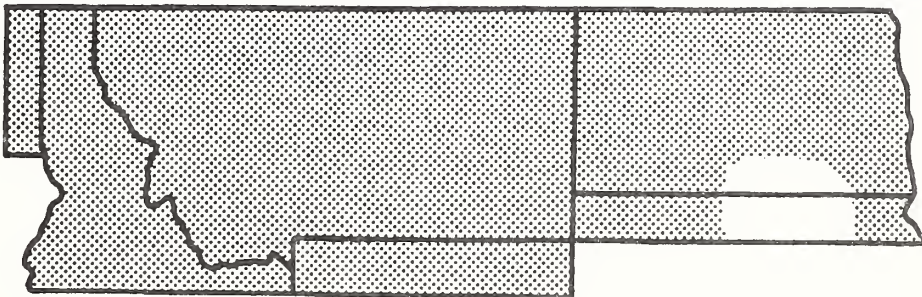
**HABITAT REQUIREMENTS:** Disturbed grasslands, riparian thickets and woodlands, aspen groves, agricultural lands, marshes, vicinity of human habitations. Nests colonially in trees, shrubs, emergent vegetation, and on the ground.

**FEEDING:** Insects, spiders, and other terrestrial as well as aquatic invertebrates are all consumed; also takes seeds of grasses and a few forbs, and small fruits. Forages primarily on the ground, occasionally wades into shallow water to forage on aquatic items, gleans from low foliage, and hawks flying insects.

**STATUS AND MANAGEMENT:** Numbers appear stable in Idaho, declining significantly in Montana, and increasing sharply and significantly in North

Dakota. Declining significantly in the West as a whole, and declining modestly on a continent-wide basis, with a significant overall decline in the most recent survey year. Range has expanded eastward and numbers have increased greatly in response to spread of agriculture, and has become closely associated with agricultural and urban/suburban landscapes. The declines seen in BBS data may be more apparent than real as populations have shifted increasingly into disturbed, human-dominated landscapes and away from many of the western BBS routes. Common cowbird host.

**FURTHER READING:** Balph, 1975; Furrer, 1975; Horn, 1970; Orians, 1985.





# ORCHARD ORIOLE

*Icterus spurius*

Icterinae

Summer Resident

WINTERING AREA: 3

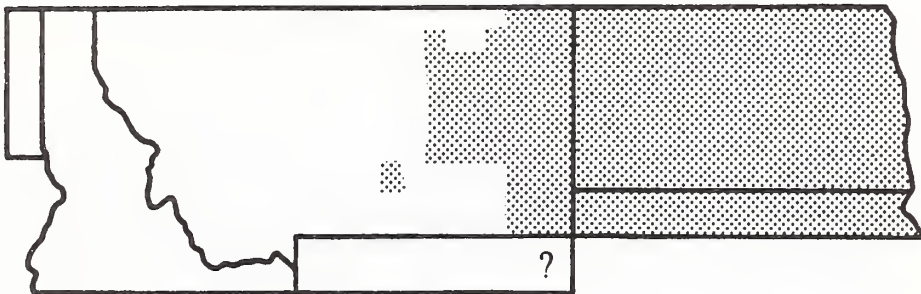
**HABITAT REQUIREMENTS:** Riparian woodlands, shelterbelts, orchards, residential areas of towns and farms providing mature trees and shrubs. Nests in deciduous tree, less commonly in shrub.

**FEEDING:** Consumes insects, fruit, and tree blossoms by gleaning from foliage in trees and shrubs.

**STATUS AND MANAGEMENT:** Westernmost extent of breeding range is eastern Montana, where BBS

sample sizes are too small to project population trends: numbers are significantly increasing in North Dakota in contrast to an overall declining trend in the western portion of the oriole's range. Populations are declining significantly when viewed continent-wide, with widespread significant declines in the most recent survey years. Common cowbird host.

**FURTHER READING:** Enstrom, 1992; Sealy, 1980a.



# NORTHERN ORIOLE

*Icterus galbula*  
Icterinae

Summer Resident



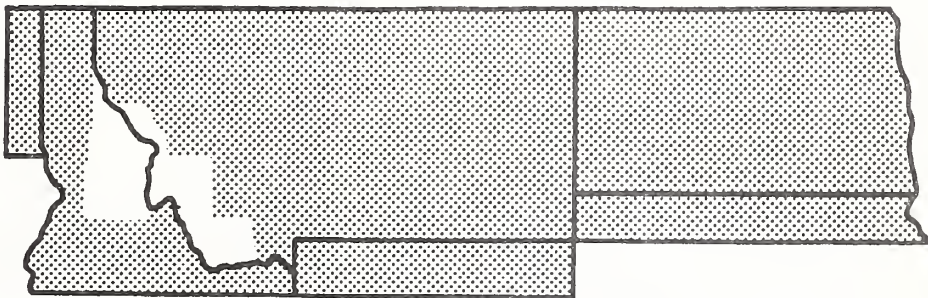
WINTERING AREA: 3

**HABITAT REQUIREMENTS:** Riparian and other open woodlands, open deciduous forest, shelterbelts, residential areas of towns and farms providing mature trees and shrubs; rarely extends above lowest elevations in mountains. Nests in deciduous trees.

**FEEDING:** Takes insects, spiders, snails, fruit, buds, and floral nectar. Forages by gleaning from foliage in trees and by hawking flying insects.

**STATUS AND MANAGEMENT:** Numbers appear to be declining in Idaho, stable in Montana, and increasing in North Dakota. In the West overall, as well as continent-wide, numbers appear to be stable. Uncommon cowbird host.

**FURTHER READING:** Butcher, 1991; Edinger, 1988; Pleasants, 1979; Rohwer and Manning, 1990; Rohwer et al., 1989; Sealy, 1980b.



# CASSIN'S FINCH

*Carpodacus cassinii*  
Fringillidae

Summer, Permanent, or Winter Resident

WINTERING AREA: 5

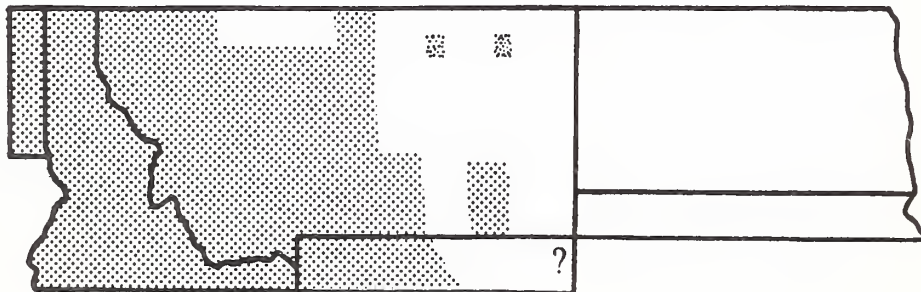
**HABITAT REQUIREMENTS:** Drier montane coniferous forests and woodlands, especially of ponderosa pine. Nests in coniferous trees.

**FEEDING:** Dines primarily on seeds of conifer trees, also takes insects, buds and berries. Forages on the ground and by gleaning from foliage in trees and shrubs.

**STATUS AND MANAGEMENT:** Numbers have been highly erratic in Idaho but appear to be increasing

there; numbers have been more stable in Montana but appear to be declining slightly. In the West as a whole, numbers show a small but significant increasing trend. Prefers older rotation-age stands (Mannan and Maslow, 1984) and harvest units (Moore, 1992) over old growth. Cassin's Finch is a nomadic, semi-colonial breeder with resultant fluctuations in local population numbers.

**FURTHER READING:** Hejl et al., 1988; Mewaldt and King, 1985; Samson, 1976.



# PINE SISKIN

*Carduelis pinus*  
Fringillidae

Permanent Resident (or altitudinal migrant) from Montana westward, usually only a Summer Resident in North Dakota

WINTERING AREA: 6

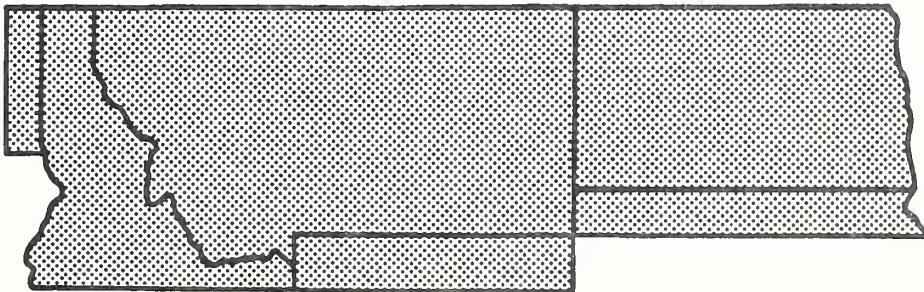
**HABITAT REQUIREMENTS:** Coniferous and mixed coniferous-deciduous forest, only rarely in deciduous forest. Nests in coniferous tree, only rarely in deciduous tree.

**FEEDING:** Diet is comprised primarily of seeds from coniferous and deciduous trees, grasses, and forbs, and of floral buds, nectar, and sap of trees, as well as occasional insects. Forages by gleaning from foliage in trees and by picking items from the ground.

**STATUS AND MANAGEMENT:** Numbers appear to be declining in Idaho where there have been marked fluctuations, stable in Montana, and declining

slightly or stable in North Dakota where sample sizes are fairly small. In the West overall and continent-wide, numbers appear stable, although declines in several areas are evident in the most recent survey years. These patterns should be assessed cautiously, as populations fluctuate greatly between years. Pine Siskins generally prefer rotation-age forest over old growth (Hejl et al., in preparation) and respond positively to forest fragmentation (Keller and Anderson, 1992; Tobalske et al., 1991). Forms winter flocks, often mixed with other goldfinches, crossbills, and juncos, that move nomadically over large areas. Uncommon cowbird host.

**FURTHER READING:** Hejl et al., 1988.





# AMERICAN GOLDFINCH

*Carduelis tristis*

Fringillidae

Summer Resident, but occasionally a Permanent Resident from western and southwestern Montana westward

WINTERING AREA: 5

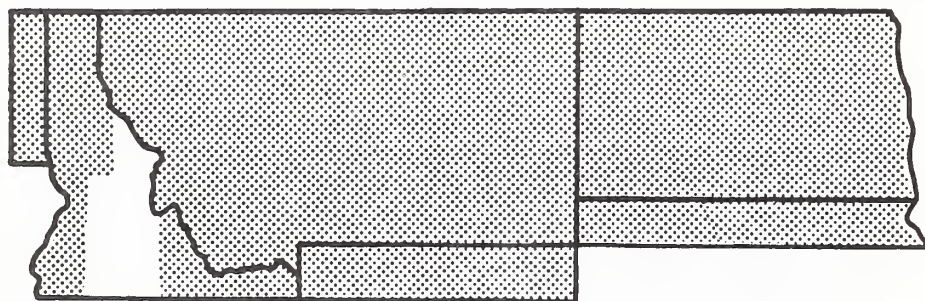
**HABITAT REQUIREMENTS:** Second-growth deciduous woodland, riparian woodland, abandoned fields, prairie thickets, shelterbelts, wooded residential areas. Nests in shrub or small tree, usually near water.

**FEEDING:** Diet comprised primarily of seeds from deciduous trees, forbs (especially composites), and grasses, also takes floral buds, berries, and a few insects. Forages mostly by gleaning from foliage but also picks items from the ground.

**STATUS AND MANAGEMENT:** Numbers appear to be declining slightly in Idaho, increasing slightly

in Montana, and increasing in North Dakota. Declining slightly in the West overall and significantly declining when viewed continent-wide, although the picture is a mixed one with significant declines in the midwest and significant increases in the northeast during the most recent survey year. May utilize early successional stages following woodland logging or fires. Common cowbird host.

**FURTHER READING:** Benkman and Pulliam, 1988; Middleton, 1978, 1979; Skagen, 1987.







Avian species occurrence in major habitat types of the northern Rockies and Great Plains\*.

Species	Douglas-fir	Ponderosa Pine	Western White Pine/Larch	Lodgepole Pine	Fir/Spruce	Montane/Alpine Meadow	Aspen/Hardwoods	Montane Riparian	Plains Riparian	Shelterbel/Woodlot	Pine/Oak Badlands/Jumper	Northern Plains Grasslands
Turkey Vulture	X	X	X	X	X	X	X	X	X	X	X	X
Osprey	X	X	X	X	X		X	X	X			
Northern Harrier						X		X	X	X	X	X
Sharp-shinned Hawk	X	X	X	X	X	X	X	X	X	X	X	X
Cooper's Hawk	X	X	X	X	X	X	X	X	X	X	X	X
Northern Goshawk	X	X	X	X	X	X	X	X	X	X	X	
Broad-winged Hawk									X	X	X	
Swainson's Hawk		X				X	X	X	X	X	X	X
Red-tailed Hawk	X	X	X	X	X	X	X	X	X	X	X	X
Ferruginous Hawk											X	X
Golden Eagle	X	X	X	X	X	X	X	X	X	X	X	X
American Kestrel	X	X	X	X	X	X	X	X	X	X	X	X
Merlin	X	X	X	X	X		X	X	X	X	X	X
Peregrine Falcon	X	X	X	X	X	X	X				X	
Prairie Falcon		X				X	X				X	X
Mountain Plover						X						X



Species	Douglas-fir	Ponderosa Pine	Western White Pine/Larch	Lodgepole Pine	Fir/Spruce	Montane/Alpine Meadow	Aspen/Hardwoods	Montane Riparian	Plains Riparian	Shelterbel/Woodlot	Pine/Oak Brushy Woodland	Badlands/Juniper	Northern Plains Grasslands
Killdeer						X		X	X				X
Willet								X	X				X
Spotted Sandpiper						X		X	X				X
Upland Sandpiper						X			X				X
Long-billed Curlew						X			X				X
Marbled Godwit						X			X				X
Mourning Dove	X	X		X	X	X	X	X	X	X	X		X
Yellow-billed Cuckoo								X	X	X			
Black-billed Cuckoo								X	X	X	X		X
Flammulated Owl	X	X	X	X	X		X	X					
Burrowing Owl						X							X
Long-eared Owl	X	X	X	X	X	X	X	X	X	X	X		
Short-eared Owl		X				X	X	X	X				X
Common Nighthawk	X	X			X	X	X	X	X	X	X		X
Common Poorwill	X	X			X		X	X			X		X
Chimney Swift									X	X			X
Vaux's Swift	X	X	X	X	X	X	X	X					
Black Swift	X				X	X	X	X					

Species	Douglas-fir	Ponderosa Pine	Western White Pine/Larch	Lodgepole Pine	Fir/Spruce	Montane/Alpine Meadow	Aspen/Hardwoods	Montane Riparian	Plains Riparian	Shelterbel/Woodlot	Pine/Oak Brushy Woodland	Northern Plains Grasslands
White-throated Swift	X	X	X	X	X	X	X	X				
Ruby-throated Hummingbird									X	X	X	
Black-chinned Hummingbird	X	X	X		X	X	X	X				
Calliope Hummingbird	X	X	X	X	X	X	X	X				
Broad-tailed Hummingbird	X	X	X	X	X	X	X	X				
Rufous Hummingbird	X	X	X	X	X	X	X	X				
Belted Kingfisher								X	X			
Lewis' Woodpecker	X	X	X		X		X	X				
Yellow-bellied Sapsucker								X	X	X		
Red-naped Sapsucker	X	X	X	X	X		X	X				
Williamson's Sapsucker	X	X	X	X	X		X	X				
Olive-sided Flycatcher	X	X	X	X	X		X	X	X			
Western Wood-Pewee	X	X	X	X	X		X	X	X	X		
Eastern Wood-Pewee									X	X		
Least Flycatcher									X	X		
Hammond's Flycatcher	X	X	X	X	X		X	X				
Dusky Flycatcher	X	X	X	X	X	X	X	X				



Species	Douglas-fir	Ponderosa Pine	Western White Pine/Larch	Lodgepole Pine	Fir/Spruce	Montane/Alpine Meadow	Aspen/Hardwoods	Montane Riparian	Plains Riparian	Shelterbelts/Woodlot	Pine/Oak Brushy Woodland	Badlands/Juniper	Northern Plains Grasslands
House Wren	X	X	X	X	X	X	X	X	X	X	X		
Sedge Wren									X				X
Marsh Wren						X		X	X				X
Ruby-crowned Kinglet	X	X	X	X	X		X	X	X	X	X		
Eastern Bluebird									X	X			
Western Bluebird	X	X	X	X	X	X	X	X					
Mountain Bluebird	X	X	X	X	X	X		X	X				
Townsend's Solitaire	X	X	X	X	X	X	X	X	X				
Veery								X	X	X			
Swainson's Thrush	X	X	X	X	X		X	X	X				
Hermit Thrush	X	X	X	X	X	X	X	X	X	X			
American Robin	X	X	X	X	X	X	X	X	X	X	X		X
Gray Catbird		X					X	X	X	X	X		X
Northern Mockingbird		X					X	X	X	X	X		
Sage Thrasher								X					
Water Pipit						X		X	X				X
Sprague's Pipit													
Cedar Waxwing	X	X			X		X	X	X	X	X		



Species	Douglas-fir	Ponderosa Pine	Western White Pine/Larch	Lodgepole Pine	Fir/Spruce	Montane/Alpine Meadow	Aspen/Hardwoods	Montane Riparian	Plains Riparian	Shellerbell/Woodlot	Pine/Oak Brushy Woodland	Badlands/Juniper	Northern Plains Grasslands
Loggerhead Shrike	X	X				X	X	X	X	X	X	X	X
Bell's Vireo									X		X		
Solitary Vireo	X	X	X	X	X		X	X					X
Yellow-throated Vireo									X	X			
Red-eyed Vireo	X	X					X		X	X	X		
Warbling Vireo	X	X		X	X		X	X	X	X	X		
Tennessee Warbler							X						
Orange-crowned Warbler	X	X		X	X		X	X	X		X		
Nashville Warbler	X		X		X		X	X					
Yellow Warbler	X	X	X	X	X	X	X	X	X	X			
Yellow-rumped Warbler	X	X	X	X	X		X	X	X	X	X		
Townsend's Warbler	X	X	X	X	X		X	X					
Black-and-white Warbler									X	X	X		
American Redstart							X	X	X	X			
Ovenbird								X	X		X		
Northern Waterthrush			X				X	X	X				
MacGillivray's Warbler	X	X	X	X	X	X	X	X					
Common Yellowthroat	X	X	X	X	X	X	X	X	X	X	X		X

Species	Douglas-fir	Ponderosa Pine	Western White Pine Larch	Lodgepole Pine	Fir/Spruce	Montane/Alpine Meadow	Aspen/Hardwoods	Montane Riparian	Plains Riparian	Shelburne/Woodlot	Pine/Oak Brushy Woodland	Badlands/Juniper	Northern Plains Grasslands
Wilson's Warbler	X	X	X	X	X	X	X	X	X	X			X
Yellow-breasted Chat		X	X				X	X					
Scarlet Tanager									X	X			
Western Tanager	X	X	X	X	X		X	X					
Lazuli Bunting	X	X			X	X	X	X	X	X	X		
Indigo Bunting		X						X	X	X	X		
Dickcissel													X
Rose-breasted Grosbeak								X	X	X			
Black-headed Grosbeak	X	X	X		X		X	X	X	X	X		
Green-tailed Towhee		X				X	X	X			X		
Rufous-sided Towhee	X	X	X	X	X		X	X	X	X	X		X
Chipping Sparrow	X	X	X	X	X	X	X	X	X	X	X		
Clay-colored Sparrow									X				X
Brewer's Sparrow													X
Vesper Sparrow			X					X			X		X
Lark Sparrow								X	X	X	X		X
Sage Sparrow			X			X							
Savannah Sparrow			X			X		X	X				X

Species	Douglas-fir	Ponderosa Pine	Western White Pine/Larch	Lodgepole Pine	Fir/Spruce	Montane/Alpine Meadow	Aspen/Hardwoods	Montane Riparian	Plains Riparian	Shelterbelts/Woodlot	Pine/Oak Brushy Woodland	Badlands/Juniper	Northern Plains Grasslands
Lark Bunting											X		X
Baird's Sparrow													X
Grasshopper Sparrow											X		X
Fox Sparrow	X	X			X	X	X	X	X	X			
Song Sparrow	X	X			X	X	X	X	X	X	X		X
Lincoln's Sparrow	X			X	X	X	X	X	X				
Swamp Sparrow					X	X		X	X	X			
White-crowned Sparrow	X	X		X	X	X	X	X	X	X	X		X
Dark-eyed Junco	X	X	X	X	X	X	X	X	X	X	X		X
McCown's Longspur													X
Chestnut-collared Longspur													X
Bobolink									X				X
Red-winged Blackbird						X		X	X	X			X
Western Meadowlark					X	X			X	X	X		X
Yellow-headed Blackbird								X			X		X
Brewer's Blackbird	X	X			X	X	X	X	X		X		X
Orchard Oriole									X	X			
Northern Oriole	X	X	X		X		X	X	X	X	X		

Species	Douglas-fir	Ponderosa Pine	Western White Pine Larch	Lodgepole Pine	Fir/Spruce	Montane/Alpine Meadow	Aspen/Hardwoods	Montane Riparian	Plains Riparian	Shelterbel/Woodlot	Pine/Oak Brushy Woodland	Badlands/Juniper	Northern Plains Grasslands
Cassin's Finch	X	X	X	X	X	X	X	X	X				
Pine Siskin	X	X	X	X	X	X	X	X	X	X			
American Goldfinch	X	X				X	X	X	X	X	X		X

\*Based in part on DeGraff et al., 1991.









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